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Food Technology Abstracts

Central Food Technological Research Institute, Mysore.

National Information System for Science and Technology
Department of Scientific and Industrial Research, New Delhi.

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FOOD TECHNOLOGY ABSTRACTS

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ABBREVIATIONS

A	ampere
AAS	atomic absorption Spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc
ECD.	electron capture detection
EDTA	ethylenediaminetetra acetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto-[10^{-15}, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycle/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lb	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt	.molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [kg m/s^2]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
p	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	south, Southern, etc.
s.d.	standard deviation
SDS	sodium dedecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
w	watt
W.	West,Western,etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-[as in g, m]
%:	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

Language of text	
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
spanish	Es
swedish	Sv

GENERAL

1504

Molnar (PJ). **A theoretical model to describe food quality.** *Journal of Food Quality* 12(1): 1989; 1-11

1505

Youssef (MM). **Instantization and evaluation of some traditional Egyptian foods.** *Food Chemistry* 38(4): 1990; 247-254

The present work covers four traditional Egyptian foods: *medammis* (stewed faba beans *Vicia faba* L.), *Kishk* (fermented and cooked product, mainly from wheat flour), *Bellila* (whole wheat kernels boiled in water for a long period) and cooked rice with milk as a dessert. Data obtained revealed a good acceptability for the products. The proximate chemical comp. showed that all the products are good source of protein (19.7 - 32.7%), carbohydrates (62.6 - 74.9%) and minerals (Ca, P, Mg, Fe and Mn). The instant products possessed good *in vitro* digestibility ranged between 76.3 plus or minus 0.7% and 89.3 plus or minus 0.8% being the lowest for whole *Medammis* and the highest for rice with milk, and C-PER as follows: 0.95 (whole *Medammis*), 0.98 (*Kishk*), 1.33 (dehulled *Medammis*), 1.47 (*Bellila*) and 2.41 (rice with milk). BV

1506

Price (BJ) and Major (HW). **X-ray fluorescence proves useful for quality control.** *Food Technology* 44(9): 1990; 66, 68, 70

This article provides an update of the current XRF-technology. It outlines a few typical food applications of XRF and provides some guidelines for making purchase decisions. BV

1507

Ogunsua (AO), Ariahu (CC) and Adebona (MB). **Post-harvest changes in periwinkle (*Tympanostomus fuscatus*) at tropical ambient storage conditions.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990; 343-348

1508

Anand (S) and Padekar (VS). **Introducing food processing technologies in tribal areas: the challenge.** *Appropriate Technology* 17(3): 1990; 28-30

1509

Doraiswamy (LK). **Technology development and transfer in India. The agony and the ecstacy.** *Chemical Age of India* 41(3): 1990; 175-187

The Indian R and D scene over the last three decades with particular reference to attitudes and policies has been reviewed. This article covers briefly the chem. technology spectrum, R and D in government and industry, model for technology transfer: technology transfer models, the size of the Indian R and D effort, total self-sufficiency, technology absorption: recognition of notable achievements, serendipity in research, (from concept to commercialisation, the need for indulgent management, the decision-making process, professionalism to the fore), innovative project engineering, government policy and production cost, and development and transfer (timeliness, the need for sound market research and the need for a product champion) SRA

FOOD PROCESSING

1510

Dziezak (JD). **Membrane separation technology offers processes of unlimited potential.** *Food Technology* 44(9): 1990; 108-113

Application of membrane processes in dairy, juices, wine and beer, and natural colorants and flavours, and its economic consideration has been presented. Types of membrane configuration is also detailed. GAR

1511

Rajyalakshmi (P) and Geervani (P). **Studies on tribal foods of South India: Effect of processing methods on the vitamin and *in vitro* protein digestibility (IVPD) of cereals/millets and legumes.** *Journal of Food Science and Technology (India)* 27(5): 1990; 260-263

The cereal/millet preparations traditionally prepared and consumed by the tribals of Vizianagaram district of Andhra Pradesh were prepared in the lab. by conventional methods. The preparations were analysed for thiamine and niacin contents and for *in vitro* protein digestibility. The tribal cereal/millet preparations prepared by boiling exhibited a marked loss of thiamine (75-100%) and niacin (24-75%). Another traditional millet preparation containing *conjee* (water strained after boiling of rice) and kept overnight showed no loss of the vitamins. Ragi (finger millet) *ambali*, a fermented and cooked product of ragi showed an increase in both thiamine (50%) and niacin (37%) contents. Cereal and millet prepared by boiling

showed a decrease of 9-24% in IVPD, whereas legumes showed an increase of 15-32% in IVPD. AS

1512

Mohr (K-H) and Skrok (S). **Calculation of cooking values C $_0$ of solid foodstuffs.** *Die Nahrung* 34(3): 1990; 219-224 (De)

For optimal processing during sterilization it is important to structure the temp.-time influence on the foodstuff in order to ensure that sterilization safety is reached, but that negative changes of the product are reduced to the min. possible. The quality of sterilized products is characterized by the cooking value C $_0$. In this essay equations and a table for the calculation of cooking values C $_0$ for vegetable products under sterilization conditions are given. AS

1513

Dealler (S), Rotowa (N) and Lacey (R). **Microwave reheating of convenience meals.** *British Food Journal* 92(3); 1990; 19-21

Research on the elimination of *Salmonella* and *Listeria* in microwave reheating of convenience meals is described. BV

1514

Blackholly (H) and Thomas (P). **Food irradiation. The technological fix of the 1990s ?.** *British Food Journal* 91(6); 1989; 22-25

Extrusion cooking

1515

Ferdinand (JM), Lai-Fook (RA), Ollett (A-L), Smith (AC) and Clark (SA). **Structure formation by carbon dioxide injection in extrusion cooking.** *Journal of Food Engineering* 11(3); 1990; 209-224

The effect of carbon dioxide injection into an extrusion cooker on extruder operation and extrudate structure was studied in the absence of steam expansion. The bulk density of extruded potato granules, maize and wheat starch decreased with the pressure of injected gas, although at higher pressures the extruded structure collapsed. The actual densities and structures achieved by carbon dioxide injection varied with extrusion conditions of feed rate, screw speed and barrel temp. Carbon dioxide injection did not produce such expanded extrudates as conventional steam flashing. However, these structures were produced under low temp. and high moisture conditions, such that the starch component received minimal degradation as shown by the low solubility characteristics. AS

1516

Jager (T), Van Zuilichem (DJ), Stolp (W) and Van't Riet (K). **Residence time distributions in extrusion-cooking. 6. Viscous dissipation in a drossel element in the feed zone of a counter-rotating, twin-screw extruder.** *Journal of Food Engineering* 12(1); 1990; 67-82

FOOD PACKAGING

Packaging materials

Plastics

1517

Baldev Raj, Murthy (RAN), Vijayalakshmi (NS), Indiramma (AR), Balasubrahmanyam (N), Veerraju (P). **Migration studies on some selected commercial plastics packaging materials for food contact applications.** *Journal of Food Science and Technology (India)* 27(6); 1990; 323-327

Commercial plastics materials used for food packaging applications were evaluated by migration tests to assess the suitability for food packaging. The tests were carried out as per the conditions prescribed by the Bureau of Indian Standards and the Food and Drug Administration (USA). Most of the tested materials had overall migration values within the specified limits. In case of some pigmented packaging materials, there was, however, the problem of leaching of colour. The PVC-based materials had the problem of odour. The uses of stretch blown polyester and PVC bottles appear to be limited to room temp. filling and storage due to appreciable shrinkage at temperatures greater than 60 C. AS

FOOD ENGINEERING AND EQUIPMENT

Engineering

1518

Harrod (M). **Modelling of the media-side heat transfer in scraped surface heat exchangers.** *Journal of Food Process Engineering* 13(1); 1990; 1-21

The heat transfer on the media-side and in the tube wall of scraped surface heat exchangers was investigated when the product was heated with steam or cooled with water. The heat transfer coeff. found experimentally were 15% higher than predicted with the Nusselt theory for steam condensation, and 30% lower than predicted with a

traditionally recommended model for cooling with water. New, much better models for the media-side heat transfer were developed. The choice of model for the media-side affects a subsequent modelling of the heat transfer on the product-side. When the product-flow was laminar in the scraped surface heat exchangers, the heat transfer was controlled mainly by the resistance on the product-side; while the resistance on the media-side was very small. Vortical flow decreased the resistance on the product-side considerably and made the choice of material in the tube wall important from a heat transfer point of view. AS

1519

Harrod (M). **Temperature variations in the outlet from scraped surface heat exchangers.** *Journal of Food Process Engineering* 13(1): 1990: 23-38

The radial temp. differences and the stability of the temp. in the product outlet from scraped surface heat exchangers (SSHE) have been investigated over wide ranges of operating conditions. When the flow was vortical, the temp. were stable and no radial differences occurred. When the flow was laminar, channelling effects occurred. The radial temp. differences of the outlet from SSHEs were sometimes very large. The flow was unstable; this was most obvious from the temp. variations close to the blades. In some cases the central parts of the product passed straight through the SSHE without being heated or cooled. Thus, efficient mixing of the product after the SSHE is of primary importance in many applications with high-viscosity products, e. g., aseptic processing, or the modelling of the performance of SSHEs. A static mixer after the SSHE eliminated the radial temp. differences, but in some cases unstable temp. remained after the mixer due to unstable flow conditions in the SSHE. The degree of stability was influenced by the design of the SSHE and by the flow rate. AS

1520

Harrod (M). **Methods to distinguish between laminar and vortical flow in scraped surface heat exchangers.** *Journal of Food Process Engineering* 13(1): 1990: 39-57

The transition between laminar and vortical flow has been investigated in scraped surface heat exchangers (SSHEs), using new methods based on viscosity and temp. measurements. The transition occurred close to the critical Reynolds number for annular flow of Newtonian fluids. Thus, the methods used to predict the viscosity can be successfully applied to SSHEs despite the very complex flow behaviour of the products, the complex geometry of the SSHEs, and the heat transfer in the SSHEs. In industrial applications, the transition can be detected using the new method based on temp. measurements at the outlet of the SSHEs together with some calculations. This is a very important result, since with this "sensor" the flow pattern can be controlled towards the optimal flow pattern in SSHEs, which in turn is a fundamental requirement when the taste of aseptic products containing particulates are to be improved by the introduction of continuous sterilization. AS

1521

Harrod (M). **Modelling of laminar heat transfer in scraped surface heat exchangers.** *Journal of Food Process Engineering* 13(1): 1990: 59-78

Heat transfer exp. with starch pastes have been performed in pilot plant scraped surface heat exchangers (SSHE). Effects of the following variables were considered in the modelling of the laminar heat tranfer: rotational speed; viscosity, flow rate, number of blades, radius ratio and heat transfer direction. The poor radial mixing restricted the heat transfer coeff. When the radius ratio increased, the heat transfer rate increased. This was probably due to increasing mixing effects from the blades. The flow rate and the heat transfer directions did not affect the heat transfer coeff. The scatter in the heat transfer coeff. was considerable, due to unstable flow conditions in the SSHEs. However, the scatter was reduced, compared with previous investigations, by the use of a static mixer after the SSHEs, since the radial temp. differences were eliminated. Better design of rotor and blades may improve the performance of SSHEs operating with laminar flow. AS

1522

Harrod (M). **Modelling of vortical heat transfer in scraped surface heat exchangers.** *Journal of Food Process Engineering* 13(1): 1990: 79-111

Heat transfer exp. have been performed in pilot plant scraped surface heat exchangers, using starch pastes and water as model products. When the flow was vortical, the backmixing effects were considered using the plug flow and axial dispersion model; the true surface heat transfer coeff. and axial dispersion coeff. were determined from temp. measurements. These coeff. were modelled and the following variables were considered: rotational speed, viscosity, flow rate, number of blades, radius ratio and heat transfer direction. Using these models, the overall heat transfer coeff. and the axial temp. profiles can be predicted quite precisely for SSHEs over a wide range of operating conditions. The first blade improved the heat transfer coeff. while additional blades did not; and heat transfer was higher when the radius ratio was 0.5 than when it was 0.75. The differences between previously

proposed models are explained. The most favourable flow pattern in SSHEs occurred when the flow was vortical, but close to the transition point to laminar flow. AS

1523

Gordon (C) and Thorne (S). **A computerised method for determining the thermal conductivity and specific heat of foods from temperature measurements during cooling.** *Journal of Food Engineering* 11(3): 1990: 175-185

A method is described for estimating the thermal conductivity, specific heat and the heat transfer coeff. to a spherical foodstuff, from the density of the food and temp./time data at two points within the food during cooling. Three quantities were derived from equations describing temp. at 2 points within a sphere during cooling, which are functions of thermal conductivity, specific heat, density and external heat transfer coeff. Density was measured and the three other variables were determined. The relationships between these variables and the derived quantities were evaluated by multiple linear regression and expressed as polynomials. The first roots of these expressions were extracted by the Newton-Raphson technique and the expressions were then reduced in degree to yield subsequent roots. A routine was devised which selected the set of roots most appropriate to the original material. The values for thermal conductivity and specific heat estimated by this method were similar to values published in the literature. Although evaluated for spherical shapes, the method could readily be adapted to other simple geometric shapes. AS

1524

Van Zuilichem (D), Van der Laan (E) and Kuiper (E). **The development of a heat transfer model for twin-screw extruders.** *Journal of Food Engineering* 11(3): 1990: 187-207

A short review of heat transfer in extruders is given. The basic assumptions and equations are mentioned and more detailed information is given on the calculations of heat due to barrel heating and heat due to the dissipatiion of mechanical energy. The necessary dimensionless numbers for heat transfer are described and, finally, a new approach to modelling of heat transfer in extruders is introduced. 19 references. AS

1525

Hallstrom (B). **Mass transport of water in foods. A consideration of the engineering aspects.** *Journal of Food Engineering* 12(1): 1990: 45-52

The paper gives an overview picture of the role of water in heat processing of solid foodstuffs. Special attention is given to sorption isotherms and water diffusivity and recent work in this field is referred to. Thawing of foodstuffs is given as an example to illustrate the influence of water on the transfer of heat. AS

1526

Kuhn (K) and Lechert (H). **Determination of Fickian diffusion coefficients of water in foods using NMR-techniques and the DARKEN-equation.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 331-335

1527

Bell (GA) and Mellor (JD). **Further developments in adsorption freeze-drying.** *CSIRO Food Research Quarterly* 50(2): 1990: 48-53

Drying

1528

Sereno (AM) and Medeiros (GL). **A simplified model for the prediction of drying rates for foods.** *Journal of Food Engineering* 12(1): 1990: 1-11

A simplified mathematical model based on basic physical and transport properties, such as mass and heat diffusivities, is proposed for the prediction of the behaviour of foods during drying. The model takes into account the effect of moisture-solid interactions at the drying surface by means of any sorption equation available and the change in solid density due to shrinking. Fourier's and Fick's laws describe the transfer of heat and mass in the solid. At the surface, mass and heat balances together with the chosen sorption equation are used to represent the vaporization of water. Temp. and moisture-content profiles are obtained by integration of the resulting set of partial differential equations, an implicit-finite-differences algorithm being used. The model, which predicted experimental results for the drying of apple slices and carrot cubes to within 1.1% of the moisture content and 12% of the drying rate, can therefore be used for the detn. of drying profiles. AS

Equipments

1529

Chatterjee (T). **Resource saving technology modernisation and expansion of existing evaporators.** *Indian Dairyman* 43(5): 1991: 225-230

A unique technique which revolutionise the energy budgeting through its economical and effective energy consumption designs of evaporators has been described. Substantial savings could be effected by conversion of double effect plant to 5

effect evaporator and the consequent calculation of savings, and payback period; case studies involving such changes are also given. Four major objectives which could be achieved by modernisation and expansion of evaporators are (i) reduction in operating cost, (ii) increased productivity, (iii) improvement in quality, and (iv) saving the energy resources. SRA

Desolventizer

1530

Desmet India Pvt Ltd. **The new Desmet-Schumacher desolventizer.** *Chemical Age of India* 40(12): 1989: 583-585

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1531

Kiosseoglou (V) and Boskou (D). **Separation and fatty acid composition of steryl and wax esters in hexane extracts of sunflower seed, soybean and tomato seeds.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 340-342

The fatty acid comp. of steryl esters and waxes occurring in sunflower, soybean and tomato seed oil has been studied by a combination of column chromatography was applied to separate the steryl ester from the wax fraction of these oils. Long chain fatty acids were found to prevail in both steryl ester and wax fractions. The fatty acid patterns between the steryl esters and waxes of the oils studied were found to differ considerably. AS

1532

Sivaswamy (SN), Balachandran (B) and Sivaramakrishnan (VM). **Presence of polycyclic aromatic hydrocarbons in some South Indian food components.** *Indian Journal of Experimental Biology* 29(7): 1991: 611-614

Mutagenicity study was done by quantifying polycyclic aromatic hydrocarbons (PAHs) in spices, heated oil, snack foods, confectionery, vegetables (salted, sun-dried and oil fried) and fish. Results indicated that most of the pyrolysed items contained PAHs in appreciable quantities. The tabular test gives the amount of chrysene, 1,2,5,6-Dibenzanthracene and 3,4-Benzo(a)pyrene present in foods. PAHs were detected in significant levels in salted, sun-dried and oil fried vegetables and fishes. Some of the raw and uncooked food components also revealed the presence of PAHs. SRA

1533

Seifert (A), Schultz (M), Strenge (K), Muschiolik (G) and Schmandke (H). **Mechanical barrier preventing the centrifugal creaming of O/W food emulsions, stabilized by proteins.** *Die Nahrung* 34(3): 1990: 293-295

Chemistry (Analytical)

1534

Lerici (CR), Barbanti (D), Manzano (M) and Cherubin (S). **Early indicators of chemical changes in foods due to enzymic or non-enzymic browning reactions. 1. Study on heat treated model systems.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 289-294

Non-enzymic browning (NEB) was studied in aqueous model systems that consisted of glucose and glycine at 3 different solid concn. (20, 30 and 40% by wt.), each one at 3 glucose/glycine molar ratios (1:1, 2:1 and 5:1), heat treated for different times at 3 temp. (70, 80 and 90 C). 3 different indicators' of the NEB were used: optical density at 294 nm, carbon dioxide formed via Strecker degradation and volatile compounds formed during the various steps of Maillard reaction. Spectrophotometric and GC data were used in order to calculate kinetic constant and activation energy values of NEB reaction. Each indicator showed that the kinetic constant values increased with increasing solid concn. of the solution and heat treatment temp. and with the decreasing of glucose/glycine molar ratios. The activation energy, which causes carbon dioxide formation, was found to be approx. 100 Kj.mol $^{-1}$, while for Amadori compound formation the value of activation energy was about 160 Kj.mol $^{-1}$ without an evident dependence from the solid concn. of the solution or glucose/glycine molar ratio. In this study, the measure of optical density at 294 nm and carbon dioxide detection in the headspace were earlier indicators of the NEB reaction than the volatile compounds detection. AS

1535

Tarafder (PK). **A rapid ultraviolet spectrophotometric method for simultaneous determination of nitrate and nitrite in potable waters.** *Journal of the Indian Chemical Society* 67(11): 1990: 936-938

Experiment was carried out in 2 steps. In step 1, a suitable aliquot containing 0-250 µg of N (NO_3/NO_2) was diluted to 50 ml and its absorbance at 220 nm against distilled water was measured. In step 2, the same amount of aliquot of the sample was taken and 1.0 NHCl (1.0 ml) was added and digested with water for 5 min. After cooling the solution to room temp. its absorbance was measured (220 nm) against distilled water as above. A calibration curve was prepared in the range 0-350 µg N. Both nitrate and nitrite in water samples absorb together at 220 nm. The absorbance obtained from the step 1 is due to nitrate and nitrite together. The absorbance obtained in from step 2 is due to nitrate and 10% of nitrite. The suppression of nitrite absorption due to the addition of hydrochloric acid remains constant above 25 µg N/50 ml upto concn. of 250 µg of N. Below this concn. the suppression of nitrite absorption is not constant, therefore nitrite, if present below concn. of 20 µg N/50 ml, can accurately be estimated by the method of standard addition. The efficacy of the method was tested by applying it to six well-water samples collected from Shillong city. Nitrate content of each water sample was high while nitrite content was almost negligible. SRA

1536

Krause (W) and Ludwig (E). **Semiquantitative determination of lactic acid and lactate in fruit and vegetable products.** *Die Nahrung* 34(3): 1990: 297-298

1537

van de Voort (FR) and Ismail (AA). **Proximate analysis of foods by mid-FTIR spectroscopy.** *Trends in Food Science and Technology* 2(1): 1991: 13-17

1538

Canale-Gutierrez (L), Maquieira (A) and Puchades (R). **Enzymic determination of ammonia in food by flow injection.** *Analyst (London)* 115(9): 1990: 1243-1246

FOOD MICROBIOLOGY AND HYGIENE

1539

Kotzekidou (P). **Some properties of polygalacturonase produced by *Byssochlamys fulva*.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 328-330

1540

Stewart (GSAB), Denyer (SP) and Lewington (J). **Microbiology illuminated: Gene engineering and bioluminescence.** *Trends in Food Science and Technology* 2(1): 1991: 7-10

This review focuses on few potential applications of bioluminescent bacteria in microbiology. 15 references. BV

Enzymes

Cellulases

1541

Manonmani (HK) and Sreekantiah (KR). **The stability of cellulase during saccharification of bagasse.** *Journal of Food Science and Technology (India)* 27(5): 1990: 296-298

The stability of a cellulase enzyme preparation of *Trichoderma viride*, *Aspergillus ustus* and their mixtures having cellulase and D-xylanase activities was compared with a Japanese enzyme (Onozuka) during saccharification of alkali treated bagasse. A varied trend with respect to stability of these enzyme preparations was observed. Substrate presence increases the thermal stability of the enzyme during saccharification. AS

Ethyl alcohol

1542

Sreekumar (O) and Basappa (SC). **Comparative study on the estimation of ethanol in fermented samples by different methods.** *Journal of Food Science and Technology (India)* 27(6): 1990: 379-380

Five known methods such as sp. gr. method, Kozelka and Hine method, Caputi's method, Gas chromatographic and enzymatic methods have been used for the estimation of ethanol in different fermented samples, keeping the sp. gr. method as a reference. Of these methods, gas chromatographic method was simpler, more rapid, more sensitive and less expensive than the other methods. The data obtained were statistically analysed and found to be in favour of the gas chromatographic method. AS

Microorganisms

1543

Sayeed (SA) and Sankaran (R). **A study on the behaviour of air microflora in food industries.** *Journal of Food Science and Technology (India)* 27(6): 1990: 340-344

Qualitative comp. of the air microflora in convenience food factories was appreciably similar both in the day-long monitoring and spot sampling.

Bacteria constituted a dominant fraction with Gram positive cocci being the most prevalent. Species of *Aspergillus* were more abundant than other moulds. Microbial load in terms of bacteria and moulds monitored as a function of time exhibited an oscillatory behaviour during the day with peak counts coinciding with hectic processing or cleaning operations in the factories. The comp. of microflora analysed by spot sampling during the manufacture of different food items did not differ significantly from that observed on day-long sampling. The qualitative and quantitative variations in air microflora observed in the food industries seem to reflect a complex pattern of interactions between the numerous intrinsic and extrinsic parameters that govern the prevalence of microorganisms in the air. AS

1544

Farber (JM), Warburton (DW), Gour (L) and Milling (M). **Microbiological quality of foods packaged under modified atmospheres.** *Food Microbiology* 7(4): 1990: 327-334

The microbiological quality of various sandwiches and meats packaged under modified atm. was evaluated. Samples were analyzed both on the day of manufacture and at the end of shelf-life. On day 0, around 60% of products examined contained less than or equal to 10^5 total aerobic counts g^{-1}, while at the end of the shelf-life approx. 63.3% of samples contained greater than or equal to 10^7 cfu g^{-1}. *Listeria* spp. were found in 8 of the 58 lots examined, with *L. monocytogenes* being present in 5 of the 8 samples. One lot was found to contain *Aeromonas hydrophila*, while another one contained *Staphylococcus aureus*. *Clostridium botulinum* and *Salmonella* spp. were not found in any of the samples. AS

Bacteria

1545

Kivanc (M). **Antagonistic action of lactic cultures toward spoilage and pathogenic microorganisms in food.** *Die Nahrung* 34(3): 1990: 273-277

The antibacterial properties of cell-free filtrate from lactic cultures were assessed against 10 bacterial cultures. All the 5 species of lactic culture examined showed antimicrobial activity against tested bacteria. *S. aureus* was least sensitive of the tested bacteria, followed by *E. coli* and *S. typhosa*. *E. aerogenes* was the most sensitive one. *L. casei* had the greatest antimicrobial activity. *Leu. mesenteroides* weakly inhibited the growth of the tested bacteria. In general, inoculum density had little effect on inhibition. AS

1546

Schillinger (U) and Holzapfel (WH). **Antibacterial activity of carnobacteria.** *Food Microbiology* 7(4): 1990: 305-310

This is the first report on bacteriocin production of the genus *Carnobacterium*. A total of 37 strains of carnobacteria were screened for antagonistic activities against other microorganisms, including enterotoxigenic and pathogenic bacteria such as *Staphylococcus aureus* and *Listeria monocytogenes*. 18 strains have been found to produce bacteriocins or bacteriocin-like substances primarily active against other carnobacteria. The cell-free culture supernatants exhibited inhibitory activity exclusively on bacteria closely related to the producers. *L. monocytogenes was inhibited only by a supernatant that was conc. tenfold. All other Gram-positive and Gram-negative bacteria tested in an agar well diffusion assay were not sensitive to the bacteriocins. The inhibitory activity was eliminated upon treatment with trypsin but was not affected by heating (10 min, 100 C). A bactericidal mode of action was demonstrated by using* Carnobacterium piscicola *LV 61. AS*

Klebsiella pneumoniae

1547

Chein (S-P) and Fung (DYC). **Acriflavine violet red bile agar for the isolation and enumeration of *Klebsiella pneumoniae*.** *Food Microbiology* 7(4): 1990: 295-304

Lactococcus lactis

1548

Batish (VK), Ram Lal and Hrish Chander. **Effect of nutritional factors on the production of antifungal substance by *Lactococcus lactis* subsp. *Lactis* biovar *Diacetylactis*.** *Australian Journal of Dairy Technology* 45(2): 1990: 74-76

The nutritional requirements for the synthesis of antifungal substance by *Lactococcus lactis* subsp. *lactis* biovar *diacetylactis* DRCI were investigated. Of 8 different media tested, Elliker's broth was found to be the best medium for production of the antifungal substance. Organic nutrients such as glucose, yeast extract, beef extract, tryptone, casamino acids, as well as NaCl, $CaCl_2$, $MgCl_2$ and $MnSO_4$ influenced the production of antifungal substance when added to the growth medium. Each stimulated production at some concn. AS

Listeria

1549
Cox (LJ), Dooley (D) and Beumer (R). **Effect of lithium chloride and other inhibitors on the growth of *Listeria* spp.** *Food Microbiology* 7(4): 1990: 311-325

The effect of lithium chloride on the growth of *Listeria* was studied in enrichment broths to determine optimum levels for this inhibitor. *Listeria monocytogenes* was able to grow in concn. up to 2% but above this level inhibition was noted. *Enterococcus faecalis*, a major competitive organism, was inhibited by low levels of LiCl. Competitive flora able to grow in the presence of LiCl are normally inhibited by nalidixic acid except for staphylococci. Substrates such as skimmed milk powder do not affect the inhibition of competitors by LiCl significantly. Trypaflavine was shown not to inhibit significantly the *Listeria* strain studied in the presence of LiCl. The combination of LiCl, trypaflavine and nalidixic acid should be studied further in enrichment procedures for *L. monocytogenes*. AS

1550
Walker (SJ), Archer (P) and Appleyard (J). **Comparison of the *Listeria* - Tek ELISA kit with cultural procedures for the detection of *Listeria* species in foods.** *Food Microbiology* 7(4): 1990: 335-342

Listeria monocytogenes

1551
Smith (JL) and Buchanan (RL). **Identification of supplements that enhances the recovery of *Listeria monocytogenes* on modified Vogel Johnson agar.** *Journal of Food Safety* 10(3): 1990: 155-163

The modified Vogel Johnson agar was highly selective for the growth of *Listeria monocytogenes*. However the media could not permit the repair and subsequent colony formation of injured cells. The addition of 0.4% Tween-80, 25 ml/l bovine fetal serum or 50 ml/l egg yolk tellurite enrichment (50%), promoted the ability of modified Vogel Johnson agar to detect heat injured *L. monocytogenes* 100 fold. KMA

Staphylococcus aureus

1552
Shelef (LA), Wang (Z-L) and Udeogu (AC). **Growth of *Staphylococcus aureus* and enterotoxin production in foods containing polyphosphates.** *Journal of Food Safety* 10(3): 1990: 201-208

The effects of pyro- tripoly- and hexametaphosphates (0.5 and 1% w/w) on growth of *Staphylococcus aureus* strain 196 E and staphylococcal enterotoxin A (SEA) production were studied in cooked custard and beef at 22 and 30 C. No effect was observed in custard where cell numbers/g increased from 10^3 to 10^8 and SEA reached 4.2 ng/g after 48 h at 22 C, irrespective of treatment. Cell numbers in cooked beef were 10^9g after 48 h and reduced numbers (by 1.5 - 2 log cycles) were found in samples containing 0.5 and 1% pyrophosphate during incubation at 22 C but not at 30 C. KMA

1553
Sayeed (SA) and Sankaran (R). **Action of sorbic acid on *Staphylococcus* metabolism: A microcalorimetric investigation.** *Indian Journal of Experimental Biology* 29(7): 1991: 628-630

The mechanism of action of sorbic acid (SA) on *Staphylococcus aureus* has been studied using microcalorimetry (LKB 2277 Bioactivity monitor) technique as power-time (p-t) curves, which provide information about metabolic activity of the microbial population at molecular and cellular levels. Initially the influence of inoculum size on the profile of *S. aureus* thermograms was evaluated to standardise the inoculum size. Study indicated that the highly reproducible and characteristic thermograms of the microorganisms were affected significantly by the SA in a concn. dependent manner. At higher concn. of SA (greater than 0.2%) the thermograms were greatly affected in that both peak height and total area decreased significantly. Both the peak heat and total heat dissipation were affected by 50% at the max. permitted concn. (0.2%) for use in foods. SRA

Fungi

Mushrooms

1554
Morales (P), Bermudez (E), Hernandez (PE) and Sanz (B). **The mutagenicity of some Spanish edible mushrooms in the Ames test.** *Food Chemistry* 38(4): 1990: 279-288

Yeasts

1555
Huhne (K), Schweizer (M) and Schweizer (E). **Genetic manipulation of the fatty acid chain**

length pattern in yeast. *FAT Science Technology* 92(6): 1990: 232

BIOTECHNOLOGY

1556

Chakrabarti (C). **Biotechnology: The basis and the prospects.** *Journal of Scientific and Industrial Research* 48(5): 1989: 211-228

In this review, the characteristics of modern biology as opposed to classical biology are outlined. The wide-ranging applications in agriculture, industry, animal husbandry, pollution control and the social, political economic and other implications of the present and likely developments in modern biology in the immediate future are discussed. The present biotechnology scene in the US and in Japan is briefly surveyed and the directions in which our own efforts in this area may be channelized are stated. The special advantages that India has in this regard to development of biotechnology are outlined. 53 references. BV

1557

Miller (HL) and Ackerman (SJ). **Perspective and food biotechnology.** *Dairy and Food Sanitation* 10(7): 1990: 426-429

TISSUE CULTURE

Nil

FOOD ADDITIVES

1558

Blank (G), Melnyk (D) and Henderson (HM). **Sporostatic activity of eugenol in relation to spore hydrophobicity.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 361-363

The hydrophobic behavior of *Bacillus subtilis* and *B. licheniformis* spores was investigated in relation to their germination and out growth inhibition by eugenol, the essential oil of clove. Using hydrophobic assay methods including bacterial adhesion to n-hexadecane, adhesion to polystyrene and the salt aggregation test, it was determined that spores of *B. licheniformis* were more hydrophobic than those of *B. subtilis*. For the latter organism, eugenol in excess of 0.14% was required to totally inhibit germination. In contrast, 0.03% eugenol totally inhibited germination of *B. licheniformis* spores. AS

Antioxidants

1559

Williams (GM), Wang (CX) and Iatropoulos (MJ). **Toxicity studies of butylated hydroxyanisole and butylated hydroxytoluene. II. Chronic feeding studies.** *Food and Chemical Toxicology* 28(12): 1990: 799-806

1560

Williams (GM), McQueen (CA) and Tong (C). **Toxicity studies of butylated hydroxyanisole and butylated hydroxytoluene. I. Genetic and cellular effects.** *Food and Chemical Toxicology* 28(12): 1990: 793-798

Tocopherols

1561

Clark (JP), Hunsicker (JC) and Megremis (CJ). **Tocopherols: nature's antioxidant.** *Food Australia* 42(6): 1990: 262-263

Tocopherols naturally present are responsible for the enhanced oxidative stability of vegetable oils relative to animal fats. Mixed tocopherols were powerful antioxidants for lard and chicken fat, and a highly unsaturated fish oil. The oxidative stability of vegetable oils was also increased by the tocopherols even though these oils already contained significant levels of tocopherols. No prooxidant effect was observed even at tocopherol concn. greater than 1000 mg/kg. AS

Colourants

1562

Sudhir Singh and Khanna (SK). **Food colours and overall perspective.** *Indian Dairyman* 43(5): 1991: 237-239

This brief review covers the toxicity studies conducted on food colours, acceptable dairy intake (ADI) values, world production pattern of food colours, per capita consumption of food colours, viable substitutes, and proposal for the preparation of an international list of accepted food colours and controversial colours. SRA

Dyes

1563

Teijon (JM), Onrubia (JA) and Blanco (MD). **Conformational changes in lysozyme due to food dyes.** *Journal of Food Science and Technology (India)* 27(6): 1990: 372-375

Lysozyme interaction with food dyes causes conformational changes in the former. The dye concn. at which conformational transition appears is lower in the case of FAO/WHO-accepted food dyes such as tartracin and indigotin, than non-accepted ones such as eosin gelblich, although the absolute intrinsic protein viscosity in the presence of the latter dye is twice that of the former ones. However, these conformational changes do not alter the lytic activity of the enzyme, as evidenced by bacterial susceptibility tests, either through diffusion in agar or through dilution in culture broth, at these dye concn. AS

Flavours

1564

Kenney (BF). **Applications of high-performance liquid chromatography for the flavour research and quality control laboratories in the 1990's.** *Food Technology* 44(9); 1990; 76-84

The application of HPLC in testing adulteration, quantitating flavour enhancers, monitoring of natural flavour reactions, isolation and purification of flavour components, confirmation of product purity have been detailed. Advantages of HPLC over GC method has been presented. GAR

Stabilizers

Gums

1565

Damasio (MH), Capilla (C), Costell (E) and Duran (L). **Influence of composition on mechanical properties of kappa-carrageenan, locust bean gum, guar gum, mixed gels. Puncture and penetration tests.** *Revista de Agroquimica Y Technologia de Alimentos* 30(1); 1990; 109-121 (Es)

Sweeteners

1566

Grenby (TH). **Intense sweeteners for the food industry: an overview.** *Trends in Food Science and Technology* 2(1); 1991; 2-6

Saccharin, cyclamates and acesulfame-k, aspartame, prospects for high-intensity sweeteners (peptide sweeteners, thaumatins, stevioside and rebaudiosides, glycyrrhizin, sucralose and neohesperidin dihydrochalcone) are covered in this article. BV

1567

Jackson (EB). **Cerelose - its role in improved confectionery.** *Confectionery Production* 57(1); 1991; 79, 91

The properties and applications of cerelose, a natural sweetener are briefly described. Crystallisation and solubility of cerelose, toffees, caramel and fudge, powdered sherbet centres and lemonade powder, chewing gum, bubble gum, tablets and dextrose fondant are considered. BV

Sodium saccharin

1568

Masui (T), Garland (EM), Wang (CY) and Cohen (SM). **Effects of different types of diet and sodium saccharin on proliferation at the limiting ridge of the rat forestomach.** *Food and Chemical Toxicology* 28(7); 1990; 497-505

CEREALS

1569

South (JB) and Morrison (WR). **Isolation and analysis of starch from single kernels of wheat and barley.** *Journal of Cereal Science* 12(1); 1990; 43-51

1570

Baczkowicz (M), Tomasik (P) and Zawadzki (W). **Effect of ammonia on cereals.** *Starch/Starke* 42(2); 1990; 46-49

All wheat, rye and corn flours, rice, oat flakes, buckwheat as well as beans were thermolyzed in the atm. of ammonia. Results were not uniform and clearly dependent on physical and chem. properties of material processed. Both wheat and rye flours are particularly sensitive to modification with ammonia. They give products of the aroma of fresh mushrooms. This aroma turns into aroma of freshly fried meat on suspending of these products in water in order to prepare a thickener to sauces and soups. AS

1571

Chamberlain (SJ). **Determination of multi-pesticide residues in cereals, cereal products and animal feed using gel-permeation chromatography.** *Analyst (London)* 115(9); 1990; 1161-1165

Residues of organophosphorus, organochlorine and synthetic pyrethroid pesticides and insect growth regulators were determined in cereals and cereal products. Samples were extracted with

acetone-methanol and the extracts cleaned-up by gel-permeation chromatography. The mean recoveries were:99% organophosphorus; 94% organochlorine; 99% synthetic pyrethroid; and 99% insect growth regulators. AS

Barley

1572

Battershell (VG) and Henry (RJ). **High-performance liquid chromatography of alpha -amylases from germinating wheat and complexes with the $alpha$- inhibitor from barley.** *Journal of Cereal Science* 12(1): 1990: 73-81

Oats

Oat bran

1573

Nestel (PJ). **Oat bran, rice bran.** *Food Australia* 42(7): 1990: 342

Studies were conducted on twenty-four mildly hypercholesterolemic men fed with diets containing oat bran and rice bran in random order over 12 wks (4 wks per dietary period). Each source of bran provided 11.8g fibre, within a fixed diet which contained an additional 11.2g fibre per day (oat bran 95g/day, rice bran 60g/day and 35g/day). Only oat bran lowered plasma total/low density lipoprotein cholesterol significantly (-5.6 and -6.6% resp. vs wheat). Rice bran gave intermediate results (-4% reduction in LDL cholesterol and its protein, apo B). Hence rice bran favourably altered the ratio of HDL to LDL protein, considered the most sensitive lipid index of future coronary heart disease. The effects of the brans are less, however they do have a cholesterol lowering effect. BV

Rice

1574

Kim (CH) and Maga (JA). **Wild rice in extruded products.** *Lebensmittel-Wissenschaft und -Technologie* 23(4): 1990: 349-353

Varying amounts of wild rice flour (WRF) were added to either medium grain rice flour (MGRF), long grain rice flour (LGRF), long grain brown rice flour (LGBRF), corn grits (CG), or potato flour (PF). The blends were adjusted to either 15 or 22% moisture. Blends were extruded with a Brabender lab. single screw extruder operating at dough temp. of either 90, 125 or 160 C. The unit was equipped with a 3:1 compression screw operating at 100 r.p.m and a 3.175 mm die. Extrudates were evaluated for extruder torque, throughput, expansion ratio, density, and overall sensory acceptability. Torque either increased or decreased depending on base material and temp. but decreased with increasing moisture. Yields were higher at lower temp. and increased with higher WRF levels. Higher moistur levels resulted in greater throughput except for CG and PF blends. Expansion and density were not influenced by WRF levels. The sensory acceptability of LGRF/WRF at all levels of substitution was judged the best. A characteristic fermented WRF flavour was noted at the lowest addition level (10%) in MGRF and LGRF. With PF no typical WRF flavour was noted even at the highest addition level (30%). AS

1575

Pandey (JP) and Sah (PC). **Modelling of bran removal and whiteness of milled rice.** *Journal of Food Science and Technology (India)* 27(5): 1990: 256-259

Whiteness of rice was found to be strongly influenced by var. and degree of polishing. Regression models relating the process of bran removal and whiteness of rice kernels were developed. Relative increase in whiteness, due to polishing, was found to be dependent on coeff. of whiteness for a var. Utility of the concept of these parameters for performance predictions of polishers is discussed. AS

1576

Saikia (L) and Bains (GS). **Studies of some Assam rice varieties for processing and nutritional quality.** *Journal of Food Science and Technology (India)* 27(6): 1990: 345-348

Studies on processing and nutritional quality of 3 var. of Assam rice revealed a higher angle of repose with superior milling performance regarding yield of brown and head rice. 'Monoharsali' var. exhibited greater resistance to breakage among all the var. tested. Assam var. showed low protein content in brown (6.3 - 7.2%) and raw milled rice (6.0 - 6.7%). The differences in reducing sugars and amylose contents among different Assam var. of rice were not so conspicuous. Assam var. showed higher fat content both in brown and raw milled rice. AS

1577

Patil (RT), Singh (DS) and Tribelhorn (RE). **Effect of processing conditions on extrusion cooking of soy-rice blend with a dry extrusion cooker.** *Journal of Food Science and Technology (India)* 27(6): 1990: 376-378

A dry extrusion cooker Insta Pro 2000 was used in the study for extrusion of soy-rice blend in proportion of 30:70. It was observed that extrusion at lower level of moisture (12% wb) is most suitable.

The highly puffed product having bulk density of 266.23 kg/m^3, water absorption indices of 4.09 was obtained at this level of feed moisture. The moisture content of the final product was also lower (6.0%) avoiding need for further drying. AS

1578

Grewal (PK) and Sangha (JK). **Effect of processing on thiamin and riboflavin contents of some high-yielding rice varieties of Punjab.** *Journal of the Science of Food and Agriculture* 52(3): 1990: 387-391

Six high-yielding var. of rice (*Oryza sativa* L) were taken and subjected to 6 and 8% degree of milling. The raw rice and the parboiled rice were analysed microbiologically for thiamin and riboflavin contents. Milled parboiled rice contained more thiamin and riboflavin than milled raw rice at both the levels of milling because parboiling of paddy results in inward diffusion of water-soluble vitamins to the endosperm. The thiamin content of brown rice is reduced after parboiling. The loss may be due to the partial decomposition of thiamin during the stages of parboiling, but the riboflavin content of brown rice is found to be increased after parboiling. AS

Rice starch

1579

Juliano (BO) and Perez (CM). **Crystallinity of raw rice starch granules as indexed by corrosion with hydrochloric acid and amylase.** *Starch/Starke* 42(2): 1990: 49-52

After 15 day in 2.2N HCl at 35 C, residual starch of 34 granular rice starches differing in apparent amylose content (AC) and final gelatinization temp. (GT) ranged from 1.3 to 20.8% and was verified to correlate significantly with GT ($r = 0.69^{**}$) and AC ($r = 0.44^{**}$). Residual starch after 5 h corrosion with crude *Chalara paradoxa* amylase ranged from 0 to 29.4% and also correlated significantly with GT ($r = 0.45^{**}$) and AC ($r = 0.70^{**}$). The amounts of residual starch after Lintnerization and after *C. paradoxa* amylase digestion were significantly correlated ($r = 0.72^{**}$). AS

Ryes

1580

Sutton (KH) and Hay (RL). **Quantitation of rye in wheat/rye wholemeal mixtures by reversed-phase high-performance liquid chromatography.** *Journal of Cereal Science* 12(1): 1990: 25-32

1581

Kubiczek (R),Luczak (W), Molski (B) and Moczydlowski (J). **Scanning electron microscopic picture of the concentration and distribution of protein structures in the seed endosperm of low and high protein varieties of rye (*Secale cereale* L.).** *Acta Alimentaria Polonica* 15(2): 1989: 185-195

Wheat

1582

Rangaswamy (JR) and Sasikala (VB). **Comparative behaviour of cashew kernel and wheat to phosphine fumigation.** *Journal of Food Science and Technology (India)* 27(5): 1990: 284-289

Cashew kernels desorb phosphine in geometric progression till free phosphine is well within the phosphine holding capacity of cashew, and then the residue decreases regularly to zero over 9 to 20 days. This trend is reversed in the case of wheat. Desorption trends of phosphine, decrease in levels of computed residues of phosphine and negligible levels of P in cashew go to suggest that phosphine in cashew is retained by lipid portion. The latter desorbs retained phosphine completely on removal of cashew from the fumigation atm. The extensive data provided leads to a conclusion that phosphine can also become a suitable fumigant for cashew kernels. AS

1583

Leelavathi (K), Vetrimani (R) and Haridas Rao (P). **Changes in the functional characteristics of wheat during soaking and subsequent germination.** *Journal of Food Science and Technology (India)* 27(6): 1990: 349-354

Changes in the functional characteristics during soaking and germination of wheat for different periods (24, 48 and 72 h) were studied. Soaking wheat overnight considerably decreased the hardness from 9.6 - 4.0 kg/grain, hectoliter wt. from 74 - 70 kg/Hl and 1000 kernel wt. from 74 - 50 g. Subsequent germination further lowered their values gradually depending on the germination period. Flour yield decreased from 68.3 - 62.8% and colour grade value increased from 2.1 - 7.4 due to germination for 72 h. Soaking improved the colour of flour, but germination gradually darkened it as seen from the increase in colour grade value from 2.1 - 7.4. Germination lowered the gluten, sedimentation value, damaged starch, non-reducing sugars, free lipids and bound lipids, while increased the free fatty acid contents. Soaking did not affect various farinograph characteristics, but germination gradually lowered the farinograph water absorption, stability and dough development time considerably. Among the different enzymes,

lipase and protease increased while lipoxidase decreased during germination. Overall quality of bread improved on germinating wheat upto 24 h. Germination of wheat for 72 h increased the spread (5.0 - 5.4 cm) and raise (0.66 - 0.76 cm) and improved flavour and taste of biscuits. Soaking of wheat slightly deteriorated the quality of cake, while germination further affected the quality. However, cake made from wheat germinated for 24 h was acceptable. AS

Wheat bran

1584

Vetrimani (R) and Haridas Rao (P). **Studies on stabilization of wheat bran.** *Journal of Food Science and Technology (India)* 27(6): 1990: 332-335

Studies were carried out to determine the shelf-life of bran and its possible improvement by suitable processing. Inactivation of the lipolytic enzyme system in bran was achieved when bran was toasted at 175 C for 40 min. Toasting resulted in inactivation of lipase by 40%, of lipoxidase by 100% and of protease by 50%. Storage trials were conducted with samples of untoasted and toasted bran packed in polypropylene pouches (37 μ thick film). The fat acidity increased from 35 to 175.0 mg KOH/100g in raw bran stored at 27 C for 105 days whereas the increase was negligible in heat stabilised bran. The peroxide value increased from 0 to 63 and 132 meq/kg oil in toasted and raw bran resp., during the storage period. Untoasted raw bran developed rancid taste within 20 days, whereas a rancid flavour became perceptible in toasted bran only after 90 days. AS

Wheat flour

1585

Gould (JM), Jasberg (BK) and Dexter (L). **Effects of alkaline hydrogen peroxide-treated fiber ingredients on mixograph properties of wheat flour dough.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 358-360

1586

Sidhu (JS), Harinder (K), Kaur (A) and Ram (MB). **Functional and chapati making properties of hull-less barley supplemented wheat flour.** *Journal of Food Science and Technology (India)* 27(5): 1990: 311-313

Chapati making characteristics of two recently evolved hull-less barley var. were studied. Replacement of whole wheat flour upto 25% of barley flour did not affect the chapati quality adversely. The farinograph and amylograph characteristics of four of these var. are also reported. AS

1587

Tello (PG), Rubio (C), Medina (AR) and Villena (LJM). **Enzymatic hydrolysis of wheat flour using α-amylase from *A. oryzae*.** *Revista de Agroquimica Y Technologia de Alimentos* 30(1): 1990: 51-58 (Es)

The influence of pH, temp., initial substrate concn. and enzyme/substrate ratio on the enzymatic hydrolysis of wheat flour has been analyzed. α-amylase from *Aspergillus oryzae* was used in all the experiments and the kinetics of the process has been followed by determining the reducing sugars in the suspension. Experimental results showed that the best pH is comprised between 5 and 6 and the most adequate operation temp. is 50 C. For the same period of time, the rate of reaction increased with the initial concn. of substrate and with the enzyme/substrate ratio. However the rate of reaction decreased as the hydrolysis time increased, due to enzyme inhibition by the hydrolysis products, since the inactivation of α-amylases did not occur in the tested operational conditions. AS

Wheat proteins

1588

Wieser (H), Seilmeier (W) and Belitz (H-D). **Characterization of ethanol-extractable reduced subunits of glutenin separated by reversed-phase high-performance liquid chromatography.** *Journal of Cereal Science* 12(1): 1990: 63-71

Glutens

1589

Attenburrow (G), Barnes (DJ), Davies (AP) and Ingman (SJ). **Rheological properties of wheat gluten.** *Journal of Cereal Science* 12(1): 1990: 1-14

Wheat starch

1590

Sulaiman (BD) and Morrison (WR). **Proteins associated with the surface of wheat starch granules purified by centrifuging through caesium chloride.** *Journal of Cereal Science* 12(1): 1990: 53-61

Corn

1591

Van Zuilichem (DJ), Van Roekel (GJ), Stolp (W) and Van Riet (K). **Modelling of the enzymatic conversion of cracked corn by twin-screw extrusion cooking.** *Journal of Food Engineering* 12(1): 1990: 13-28

In the search for alternative uses for by-products of corn wet-milling, enzymatic conversion of cracked corn to fermentation substrates by means of twin-screw extrusion (TSE) was investigated. The conversion was initiated with starch disclosure and liquefaction in two extrusion operations. Up to 0.5% w/w heat stable α-amylase was added at a mass temp. of 120 C. The extrudate was batch-saccharified using 0.05 to 1% gluco-amylase at temp. ranging from 50 to 70 C, 20 to 40% dry matter and pH 4.5. The exp. was conducted according to the response surface analysis method, resulting in an empirical model which describes the course of the conversion into dextrose-equivalent units during saccharification at varying enzyme concn., temp. and dry-matter contents. Results show that the gluco-amylase concn. is by far the most important factor in the conversion. The plot obtained for gluco-amylase versus conversion time is approx. linear. AS

1592

Tolaba (MP), Suarez (C) and Viollaz (PE). **The use of a diffusional model in determining the permeability of corn pericarp.** *Journal of Food Engineering* 12(1): 1990: 53-66

1593

Fasiha Rehana and Basappa (SC). **Detoxification of aflatoxin B** $_1$ in maize by different cooking methods. *Journal of Food Science and Technology (India)* 27(6): 1990: 397-399

Several cooking methods used in the preparation of porridge, roti, balls and popcorn destroyed aflatoxin to an almost same degree of about 50%. However, when roti was not cooked crisp the destruction of aflatoxin was comparatively less. No aflatoxin B $_{2a}$ was found in any of the extracts of the cooked products. It is suggested that this point should be considered while performing epidemiological surveys in determining the exact dose of aflatoxin ingested and its effect in man. AS

1594

Kanta (RC) and Neelgund (YF). **Production of ethanol from maize by *Zymomonas mobilis*.** *Starch/Starke* 42(2): 1990: 44-46

Maize (*Zea mays* Ganga-5, hybrid var.) was used as a substrate for ethanol production by batch fermentation using *Zymomonas mobilis*. 20% solids concn., 72 h of duration, pH 5.5 and 30 C were found most effective in yielding max. alcohol and proved optimum for highest fermentation efficiency. AS

Corn flour

1595

Madaan (TR) and Gupta (HO). **Shelf life of maize (*Zea mays* L.) flour.** *Journal of Food Science and Technology (India)* 27(5): 1990: 299-301

Biochemical changes in the flour of two untreated maize var. viz. 'Vijay-normal' and 'Shakti-opaque-2' stored for 180 days, were studied under ambient conditions. Oil content of 'Vijay-normal' and 'Shakti-opaque-2' flours were 4.6 and 5.1% resp. Fatty acid comp. in both the var. almost remained constant during storage. Increase in peroxide and acid values during storage, ranged from 6.1 to 7.3 and 1.0 to 55.9% in 'Vijay-normal' and 7.2 to 8.2 and 0.5 to 51.5% in 'Shakti-opaque-2' resp. Bacterial count in 'Shakti-opaque-2' flour decreased whereas that of fungal infestation increased after 180 days of storage. Acid value in flour prepared after heat treatment of kernels (80 C, 3 h) was almost constant during 30 days of storage. AS

Corn starch

1596

Hartunian-Sowa (SM), White (PJ) and Batres (LV). **Influence of monoglycerides of different chain lengths on texture and flavour of breads made with waxy corn starch.** *Starch/Starke* 42(2): 1990: 53-56

The addition of monoglycerides (MGs) monolaurin (ML), monomyristin (MM), monopalmitin (MP), and monostearin (MS) to a model system bread made from waxy corn starch was studied for their effects on delaying staling. The model system breads containing 0.5% of a MG and a control bread containing no MG were prepared five different times and stored at room temp. for 1, 3 and 6 days. A sensory panel measured changes in firmness, stale flavour, and moistness, and an Instron Universal Testing Machine (model 1122) was used to indicate firmness of the samples. The volumes of the loaves were measured on day 1 for the five replications. Results indicated that the addition of MGs to the model system breads decreased firmness and stale

flavour and increased moistness compared with the control bread. Breads containing MM and MP were rated significantly ($P<0.05$) less firm and less stale on days 1 and 6 and more moist on day 1 than the breads containing MS and the control bread. In general, as the mol. wt. (MW) of the MGs increased, the firmness (by Instron) of the breads also increased, and the volume of the loaves decreased. The control bread had the highest Instron firmness value and the lowest volume when compared with the breads containing MGs. AS

1597

Khalil (MI), Hashem (A) and Hebeish (A). **Carboxymethylation of maize starch.** *Starch/Starke* 42(2): 1990: 60-63

Maize starch was reacted with monochloroacetic acid in presence of sodium hydroxide. The reaction involved is known as carboxymethylation. The latter was carried out under a var. of conditions. For every set of conditions carboxymethylation was studied with respect to the extent expressed as degree of substitution (DS) and reaction efficiency (RE). Results indicated that starch:water ratio of 1:2.5 constitutes the optimal material to liquor ratio. Increasing sodium hydroxide concn. up to 8 N causes significant enhancement in DS and R.E. while higher concn. bring about sharp decrement. DS increases as the monochloroacetic acid concn. increases: opposite trend was observed with respect to RE. Increasing duration (0.5 - 3 h) and temp. (60 - 70 C) acts in favour of both DS and RE. DS is also governed by the reaction medium. Water and organic solvents were used independently as well as in admixture of solvent/water. It was found that the highest DS is achieved with isopropyl alcohol and the least with water. The DS follows the order: isopropanol > cyclohexane > dimethyl formamide > methanol > acetone > water. Isopropanol:water mixture (80:20) constitutes the most favourable medium for the carboxymethylation reaction under the conditions used. AS

Ogi

1598

Osungbaro (TO). **Effect of fermentation period on amylose content and textural characteristics of 'ogi' (a fermented maize porridge).** *Journal of Fermentation Technology (Hakko Kogaku Zasshi)* 70(1): 1990: 22-25

Maize grains were fermented and soured for 1, 2, 4 or 6 days, for 'Ogi' making. Amylose levels decreased with days of fermentation and souring. Maize fermentation resulted in an increase of viscosity for 'Ogi' porridge of up to 4 day steeping or souring, after which further fermentation led to substantial viscosity reduction. The 2 day fermented or soured 'Ogi' appeared to have the most desirable textural characteristics in terms of starch stability and consistency as recorded by the Brabender amylograph and Adams' consistometer, and was most acceptable in terms of flavour by sensory evaluation. The results show direct correlations between the viscosities of 'Ogi' measured on the amylograph and the Adams' consistometer ($r = +0.83$). The Ferranti viscometer was adaptable to measuring 'Ogi' viscosity, and results obtained with this follow the trend in viscosity changes during maize fermentation, as recorded by the amylograph and the Adams' consistometer. Sensory evaluation scores showed very little correlation with objective measurements. AS

Sorghum

1599

Fapohunda (SO) and Ogundero (VW). **Malted *Sorghum bicolor* grains and physiology of associated microfungi.** *Die Nahrung* 34(3): 1990: 241-246

Certain aspects of the physiology of 2 microfungi associated with degradation of malted grains of *Sorghum bicolor* are studied. Isolated organisms are *Fusarium pallidoroseum* and *Alternaria tenuissima*. *Fusarium* utilized N free extract more than *Alternaria* in an acid medium, temp. of 20 and 50 C enhanced protease production in *Fusarium* and *Alternaria* resp., and both fungi preferred a substrate of malt extract agar. Both fungi have an enhanced growth in the presence of sulphur. AS

PULSES

1600

Deka (RK) and Sarkar (CR). **Nutrient composition and antinutritional factors of *Dolichos lablab* L. seeds.** *Food Chemistry* 38(4): 1990: 239-246

The mature seeds of 5 cvs of *Dolichos* bean were analysed for some nutritional and antinutritional factors. The cvs showed considerable variation in their comp. On a dry matter basis, the percentage of crude protein varied from 22.4 to 31.3, crude fibre 7.62 to 9.63 and total carbohydrate, 54.2 to 63.3. The amounts (mg/100g) of Ca, P, Phytate P and Fe ranged from 36.0 to 53.5, 388 to 483, 282 to 380 and 5.95 to 6.90, resp. All the cvs tested contained moderately high levels of trypsin inhibitor activity and 2400 - 3200 TIU g^{-1}, on a dry wt. basis, of the seeds. Phytic acid and tannins varied from 1000 to 1350 and 2000 to 2205 mg/100 g, resp. AS

1601

Ahmed (AHR) and Nour (AAAM). **Protein quality of common Sudanese leguminous seeds.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 301-304

Dry beans

1602

Bopaiah (BM) and Shantaram (MV). **Studies on cocoa processing of moisture reduction and mixing on the changes in fermentation and quality of the dry beans in monsoon season.** *Indian Cocoa, Arecanut & Spices Journal* 14(1): 1990: 1-7

Fresh cocoa beans were analysed for pH (cotyledon and pulp), pulp content, total soluble solids (TSS) and bean wt. in wet and dry season. Initial moisture reduction of cocoa beans was done in basket, gunny sacks and mechanical pressing ,prior to fermentation. The mixing schedules followed during the fermentation to mitigate the aeration, moisture and temp. of the bean mass were (i) daily mixing, (ii) mixing on 1st, 2nd, 3rd and 4th day; (iii) mixing on 1st, 3rd and 4th day; and (iv) mixing on 1st, 3rd and 5th day. Changes in temp. and cotyledon and pulp pH were monitored during the fermentation. Results indicate that moisture reduction improved the bean acidity (pH); all the mixing schedules have similar effect on the bean acidity and extent of fermentation, however four mixing schedules has improved the dry bean quality. GS

Faba beans

1603

Krause (J-P), Schultz (M) and Schmandke (H). **The adsorption behaviour of faba bean proteins at a sunflower oil-water interface.** *Die Nahrung* 34(3): 1990: 283-285

The present study aims at investigating the absorption behaviour of acetylated and non-acetylated faba bean protein isolate at a sunflower oil-water interface in dependence on different environmental conditions (protein concn., pectin addition). AS

1604

Kozlowska (H), Borowska (J), Fornal (J), Schneider (C) and Schmandke (H). **Preparation of faba bean (*Vicia faba* L. minor) products. Part IV. Effect of hydrothermal treatment of faba bean on the quality of flour.** *Acta Alimentaria Polonica* 15(2): 1989: 161-169

The most advantageous parameters of hydrothermal treatment of faba cotyledons were determined. These are: steaming temp. 110 C and time 2 min. and they caused -at relatively smay decrease of protein solubility and slight damage of cotyledons structure (SEM) -a considerable lowering of trypsin inhibitors activity and an improvement of organoleptic quality of flour obtained from thus prepared cotyledons. AS

1605

Borowska (J), Kozlowska (H) and Schneider (C). **Preparation of faba bean (*Vicia faba* L. minor) products. Part V. Effect of hydrothermal treatment of faba bean and peas on the quality of protein isolates.** *Acta Alimentaria Polonica* 15(2): 1989: 171-177

From hydrothermally treated cotyledon of faba bean and pea there were obtained protein isolates characterized by increased protein content, trace activity of trypsin inhibitors, lowered content of bonded and residual fat, and better taste compared to isolate obtained from non-treated material. This significant improvement of quality was obtained at the cost of 20% yield decrease. AS

Locust beans

1606

Aderibigbe (EY), Schink (B) and Odunfa (SA). **Extracellular proteinases of *Bacillus* spp. isolated from fermented African locust bean, Iru.** *Food Microbiology* 7(4): 1990: 281-293

Lupins

1607

Petterson (DS) and Crosbie (GB). **Potential for lupins as food for humans.** *Food Australia* 42(6): 1990: 266-268

The low content of alkaloid in lupin seeds is safe for human consumption and suggests a role as an alternative to the soybean for producing sprouts, fermented foods, sauces, tofu, beverages, dietary fibres, flour and grits, protein isolates and snack foods. The flour could be used to supplement cereal products; and fibre may have nutritional benefits. Also covered is allergenicity. BV

Mung beans

1608

Zhu (JH), Haase (NU) and Kempf (W). **Investigations on the laboratory scale separation of mung bean starch.** *Starch/Starke* 42(1): 1990: 1-4

A new efficient wet separation technique on lab. scale for separation of mung bean starch is described. Also some quality aspects of the starch are mentioned. BV

Peas

1609

Kjolstad (L), Isaksson (T) and Rosenfeld (HJ). **Prediction of sensory quality by near infrared reflectance analysis of frozen and freeze dried green peas (*Pisum sativum*).** *Journal of the Science of Food and Agriculture* 51(2): 1990: 247-260

Near infrared analysis of the freeze dried peas showed relative ability of prediction (RAP) values for the sensory variables which were higher than those for the tenderometer readings. The sensory attributes of pea flavour and hardness were predicted with higher RAP values by tenderometer readings than by NIR analysis on frozen peas. For the rest of the attributes, NIR analysis on frozen peas gave higher RAP values than tenderometer readings. NIR generally gave high RAP values, and this tentative study suggests that NIR analysis could be a useful tool in instrumentally assessing the quality of frozen peas. BV

Pigeon peas

1610

Patel (PS), Shah (PG), Patel (BK) and Patel (JR). **Residues of fenvalerate in pigeon pea (*Cajanus cajan* (L.) Mill sp.).** *Journal of Food Science and Technology (India)* 27(5): 1990: 317-318

The levels of fenvalerate residues from pigeon pea grains as well as pod shell were determined during 1986-87 and 1987-88. Three emulsion sprays (0.005%, 0.01%, 0.02%) and a dust formulation (0.4%) were applied at 25 kg/ha. The levels in pigeon pea grains at harvest did not exceed the max. residue limit of 1 p.p.m. However, more than 1 p.p.m. of residues were found in the pod shells from all the treatments except 0.005% spray. AS

Rice bean

1611

Deepinder Kaur and Kapoor (AC). **Starch and protein digestibility of rice bean (*Vigna umbellata*): Effects of domestic processing and cooking methods.** *Food Chemistry* 38(4): 1990: 263-272

The present investigation was conducted to study the *in vitro* starch and protein digestibility of 5 high-yielding var. (RB-4, RB-32, RB-37, RB-40 and RB-53) of rice bean and 1 var. each of green gram (K-851) and black gram (MT-9) as affected by various domestic processing and cooking methods which included soaking in tap water for 6, 12 and 18 h; sprouting for 40 and 60 h; ordinary cooking of unsoaked seeds and seeds soaked for 12 h; and autoclaving of unsoaked and soaked seeds. *In vitro* starch digestibility (mg maltose released/g meal) and protein digestibility (%) of raw rice bean varied from 29.3 to 36.5, and 57.2 to 62.8, resp. Both starch and protein digestibilities improved significantly on soaking, sprouting, cooking and autoclaving. There was a progressive and significant increase in starch and protein digestibility with successive increase in soaking and sprouting period. AS

Yam bean

1612

Edem (DO), Amugo (CI) and Eka (OU). **Chemical composition of yam beans (*Sphenostylis stenocarpa*).** *Tropical Science* 30(1): 1990: 59-63

OILSEEDS AND NUTS

1613

Mital (BK) and Garg (SK). ***Temeph* - Technology and food value.** *Food Reviews International* 6(2): 1990: 213-224

This article reviews preparation methods, food value, microbiology of fermentation, physicochemical changes during fermentation (antioxidants, flavour profile), use of alternate legumes and grains, and production of antimicrobial substances. 57 references. SRA

1614

Gupta (HP). **Modernisation of oilseeds and oils processing industry. Problems and prospects.** *Chemical Age of India* 41(1): 1990: 19-22

This article covers briefly present status, status of processing industry (technological), available raw material for processing rice bran, mino oilseeds of tree and forest origin, constraints (modernisation of the processing industry, production of oilseeds, production of rice bran, collection of minor oilseeds of tree and forest) and suggestions (modernisation of the industry, production of oilseeds, production of rice bran and encouragement for collection and processing of minor oilseeds). BV

1615

Lath (JP). **Collection, processing and production of minor oilseeds and its export potential. History of sal seed development in India.** *Chemical Age of India* 40(12): 1989: 575-578

1616

Agarwal (MH). **Collection, processing and production of minor oilseeds and its export potential.** *Chemical Age of India* 40(12): 1989: 589-590

Arecanuts

1617

Vigneshwara (V). **Marketing of arecanut - need for a consumer based approach.** *Indian Cocoa, Arecanut & Spices Journal* 14(2): 1990: 52-54

An investigation was made in Bangalore, to identify the consumers taste and preference for different var. of arecanut while consuming it either in pan-beedas or in other arecanut based consumable products. 50 pan-beeda shops were selected and both consumers (60 each professionals, working class and students) and shopkeepers were interviewed. Findings revealed that per day consumption of arecanut on an av. in each shop varied between one and two kg. Most of the pan-beeda shops were located either on roadsides or near hotels and bars. 58.3% of the consumers preferred Kachha (dried) var., 26.1% preferred Pacca (fried) var., 8.9% preferred wet var., and 6.7% preferred scented supari. GS

Coconuts

1618

Satyavati Krishnankutty, Mangala Kumari (CK) and Mathew (AG). **Microstructure of coconut haustorium.** *Journal of Food Science and Technology (India)* 27(5): 1990: 302-303

Microstructure of coconut haustorium was studied by optical microscopy using histochemical staining and by scanning electron microscopy. Outermost layer of the haustorium was composed of small, compactly arranged parenchyma cells and contained colourless oil droplets which stained red with Sudan IV solution. Just below the outermost layer of the haustorium, two to three layers of the spongy tissue contained both oil droplets and starch grains. Subsequent five to six layers of the spongy tissue were rich in starch grains, their size ranging from 1.5 - 2.0 µ. Innermost region of the haustorium contained very little starch. AS

Rapeseeds

Rapeseed meals

1619

Fiebig (VH-J), Jorden (M) and Aitzetmuller (K). **A new concept for the determination of total glucosinolate content. Possibilities to draw up balances in rapeseed and rapeseed meal.** *FAT Science Technology* 92(5): 1990: 173-178 (De)

Indirect analysis of the original total glucosinolate content of rapeseed and rapeseed meal via determination of released sulphate ions has been developed. Method claimed to estimate the glucosinolate content at the time of harvest, at the time of milling and in the resultant meal. Hydrolysis of glucosinolate and release of sulphate has been reported even at the drying stage of rapeseeds. N

Rapeseed proteins

1620

Schwenke (KD). **Structural studies on native and chemically modified storage proteins from rapeseed (*Brassica napus* L.) and related plant proteins.** *Die Nahrung* 34(3): 1990: 225-240

Soybeans

1621

Assoumani (MB), Nguyen (NP), Lardinois (PF), Van Bree (J), Baudichau (A), Bruyer (DC). **Use of a lysine oxidase electrode for lysine determination in Maillard model reactions and in soybean meal hydrolysates.** *Lebensmittel-Wissenschaft und - Technologie* 23(3): 1990: 322-327

As an alternative to the classic ion-exchange chromatography for lysine detn., a new specific enzymatic method based on the use of lysine oxidase (from *Trichoderma viride*) was developed. Results obtained on Maillard model reactions and on samples from soybean meal hydrolysates are described. The levulinic acid formed from acid degradation of glucose was shown to negatively affect lysine detn. Different hydrolysis conditions were examined for soybean meal and optimal results were obtained with 7 h hydrolysis time at 120 C and 1 bar pressure. AS

Soy product

Soyslurries

1622

Kumari (P) and Singh (S). **Microbial profile of soyslurries during ripening.** *Journal of Food Science and Technology (India)* 27(5): 1990: 253-255

The microbial profile of soycheese slurries was followed from 1st to 8th day of ripening at 30 C. Fresh slurries with and without lactic cultures had a total plate count of 216 x 10^4 and 13 x 10^4/g, resp. The final total plate count on 8th day was in the order of 10^8/g. Though the coliforms were absent in fresh slurries, they appeared during ripening, the final number being about 10^3/g. The fresh slurries had very low number of yeast and mould (22/g) which increased during ripening upto 10^5/g. In addition, the spore, *Lactobaccillus* and *Micrococcus* counts were also determined during storage. AS

Soy proteins

1623

Sugano (M), Goto (S), Yamada (Y), Yoshida (K), Hashimoto (Y), Matsuo (T), Kimoto (M). **Cholesterol-lowering activity of various undigested fractions of soybean protein in rats.** *Journal of Nutrition* 120(9): 1990: 977-985

The undigested high-mole.-wt. fraction (HMF) of soybean protein prepared after exhaustive digestion by microbial proteases significantly decreased serum cholesterol levels to -45% ($P < 0.05$) of those observed with the parent protein in rats fed diets containing cholesterol (0.5%) and sodium cholate (0.125%). HMF bound conjugated bile salts *in vitro* and significantly increased fecal excretion of both neutral and acidic steroids by 65 - 95% and 80 - 170% more, resp. ($P < 0.05$), than did the intact protein. Extraction of HMF with methanol slightly decreased the activity, but the methanol-soluble fraction was not regarded as a principal determinant. Soybean saponin at the dietary level equivalent to that contained in HMF did not effectively lower serum cholesterol. The activity was not necessarily duplicated even when methanol-treated fractions were recombined. Further degradation of the methanol-extracted HMF by various proteases resulted in loss of activity. HMF obtained after pepsin digestion excreted a potential similar to that of HMF prepared after digestion by microbial proteases. AS

TUBERS AND VEGETABLES

Root vegetables

Colocasia

1624

Agbor-Egbe (T) and Rickard (JE). **Identification of phenolic compounds in edible aroids.** *Journal of the Science of Food and Agriculture* 51(2): 1990: 215-221

Red beet

1625

Abeysekere (M), Sampathu (SR) and Shankaranarayana (ML). **Studies on different methods of extraction of betalaines from red beet (*Beta vulgaris*).** *Journal of Food Science and Technology (India)* 27(6): 1990: 336-339

In the search for natural pigments to replace artifical dyes in food preparations, the pigments of red beet (*Beta vulgaris*)appear to be very promising. The principal red pigment betanine might be considered as a food colourant and accounts for about 75 - 90% of the total betacyanine content of beet. In this study, the pigment recovery efficiencies by different methods of extraction like diffusion extraction in single column and multiple columns and by hydraulic pressing at the lab. level are compared. AS

Tubers

Potatoes

1626

Hallberg (ML) and Lingnert (H). **The relationship between lipid composition and oxidative stability of potato granules.** *Food Chemistry* 38(3): 1990: 201-210

Lipid oxidation and changes in the lipid comp. of potato granules during storage were studied. In particular, the possible role of the free fatty acids (FFA) in oxidation and storage stability was examined. Three potato granule materials which differed in FFA content were stored in darkness, in air at 25 C. The lipid oxidation was followed by GC headspace analysis of volatile compounds and sensory evaluation was carried out after periods of 12 and 40 wks of storage. The FFA were analysed by GC to determine fatty acid comp. during storage. All three of the potato granule materials were markedly oxidized. However, the material containing the least original amount of FFA was the most rancid after only 12 wks storage, according to

both the sensory analysis and the content of hexanal. This shows that there was no connection between the original total amount of FFA and the oxidative stability of potato granules. In the most highly oxidized material the FFA content decreased towards the end of the storage period, but in the other two materials, for which the rate of oxidation was lower, there was a slight increase of the polyunsaturated FFA (C18:2 + C18:3). This indicates that both simultaneous lipolysis and oxidation took place during storage. The fatty acid comp. within the lipid classes: neutral lipids, galactolipids, and phospholipids, were not found to change significantly during storage. AS

1627

Lisinska (G) and Aniolowski (K). **Organic acids in potato tubers: Part I. The effect of storage temperatures and time on citric and malic acid contents of potato tubers.** *Food Chemistry* 38(4): 1990: 255-261

1628

Lamberg (I), Hallstrom (B) and Olsson (H). **Fat uptake in a potato drying/frying process.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 295-300

The fat uptake during deep fat frying of potato strips, French fries, was affected by the preteatment and the frying time. The highest fat content was observed for blanched, undried potato strips. Strips blanched and dried with dry air 2% RH, showed the lowest fat uptake. The surface moisture content seemed to be the limiting factor. An increased surface moisture content resulted in an increased fat uptake. The frying time also seemed to influence the fat uptake: an increased frying time giving an increased fat uptake. During the frying process the drying rate was found to be higher at the beginning of the process. This observation was confirmed by a calculation of the mass transfer coeff.: 0.05 m/s for 1 min of frying and 0.01 m/s for 5 min of frying. AS

1629

Kozempel (MF), Tomasula (PM), Craig (JCJr) and Kurantz (MJ). **Effect of potato composition on drum dryer capacity.** *Lebensmittel-Wissenschaft und - Technologie* 23(3): 1990: 312-316

A model for predicting the production capacity of a single drum dryer for potato flakes was developed. The model uses process parameters for drum speed, steam pressure and number of spreader rolls. It also includes the texture of the raw potato, degree of cooking, starch content of the raw potato and the bulk density of the dried raw potato. The model accounted for variation observed due to cultivar and production yr. AS

1630

Lalitagauri Ray, Gouri Mukherjee and Majumdar (SK). **Production of lactic acid from potato fermentation.** *Indian Journal of Experimental Biology* 29(7): 1991: 681-682

Lactic acid is produced from potatoes by enzymatic saccharification by *Aspergillus oryzae* amylases ($alpha$-amylase and amyloglucosidase) followed by fermentation using *Lactobacillus delbruekii*. Max. conversion of starch to glucose was 75% and highest yield of lactic acid on the 5th day of fermentation was 69% on the basis of wt. of sugar supplied and 57.5% on the basis of wt. of starch supplied. Optimum conditions of fermentation for lactic acid production were 10% (v/v) inoculum vol. and pH of 5.8 - 6.2. Use of potato in place of sucrose can reduce the raw material cost by 2.5-fold. SRA

1631

O'Beirne (D) and Cassidy (JC). **Effects of nitrogen fertiliser on yield, dry matter content and flouriness of potatoes.** *Journal of the Science of Food and Agriculture* 52(3): 1990: 351-363

1632

Salama (NA). **Evaluation of potato-egg patties extended with different soy proteins.** *Acta Alimentaria Polonica* 15(2): 1989: 179-184

Potato patties were enriched with different soy proteins. This incorporation increased the protein and ash content and improved the biological value of the patties. AS

Yams

1633

Faboya (OP) and Asagbra (AA). **The physico-chemical properties of starches from some Nigerian cultivars of white yam, (*Discorea rotundata* Poir).** *Tropical Science* 30(1): 1990: 51-57

1634

Okaka (J) and Anajekwu (B). **Preliminary studies on the production and quality evaluation of a dry yam snack.** *Tropical Science* 30(1): 1990: 65-72

The development and evaluation of dry yam (*Dioscorea rotundata*) snack is studied. This study reports that flavoured yam snack can be manufactured by dehydration of cooked and flavoured yam cubes. Controlled drying was found

more quality compatible than sun-drying. Oven-dried products with or without oil treatments had a lower moisture content (9%) than sun-dried products (17% at 75% RH) and were judged superior in respect of crispness, hardness-to-bite and overall acceptance by semi-trained and consumer sensory panels (P 0.05). SRA

Vegetables

1635

Arvanitoyannis (I). **The effect of storage of canned vegetables on concentration of the metals Fe, Cu, Zn, Pb, Sn, Al, Cd and Ni.** *Die Nahrung* 34(3): 1990: 247-253

The increase in the concn. of Fe, Cu, Zn, Pb, Sn, Al, Cd and Ni over a 2 yr's time of strongly corrosive acidic vegetables (pickles) and weakly corrosive vegetables (peas, green beans, haricot beans, mushrooms) has been determined. The results show a considerable increase in Fe, Cu, Pb and Sn content with time, particularly for pickles, while the change in Al, Cd, Zn and Ni content was rather negligible. AS

Leafy vegetables

1636

Faboya (OOP). **The effect of pre-process handling conditions on the ascorbic acid content of green leafy vegetables.** *Food Chemistry* 38(4): 1990: 297-303

Amaranthus

1637

Singhal (RS) and Kulkarni (PR). **Utilisation of *Amaranthus paniculates* (Rajgeera) starch in salad dressing.** *Starch/Starke* 42(2): 1990: 52-53

Studies on utilisation of *Amaranthus paniculatas* starch in salad dressings showed it to be more stable than corn starch. This is attributed to waxy nature of *A. paniculatas* starch. AS

Amaranthus paniculatus

1638

Singhal (RS) and Kulkarni (PR). **Some properties of *Amaranthus paniculatus* (Rajheera) starch pastes.** *Starch/Starke* 42(1): 1990: 5-7

Paste viscosity, paste clarity, freeze-thaw stability and effect of shear on the viscosity of *A. paniculatus* starch paste has been studied and compared to corn starch. Rajgeera starch was found to have a higher paste viscosity, lower paste clarity and high freeze-thaw stability than corn starch. Rajgeera starch underwent thinning on being subjected to mechanical shear. The high-freeze-thaw stability and stability under pressure cooking conditions suggest its potential utility in frozen and canned foods. The low paste clarity and poor stability under acidic conditions limits its applications in food products. BV

Broccoli

1639

Brennan (PS) and Shewfelt (RL). **Effect of cooling delay at harvest on broccoli quality during postharvest storage.** *Journal of Food Quality* 12(1): 1989: 13-22

Broccoli (cv 'Green Duke") was grown, harvested and cooled prior to simulated handling and storage. Delays of cooling were 0.5 and 3.0 h in one exp. and 0.5, 1 and 2 h in a subsequent exp. Significant losses in market life of fresh broccoli were noted within the 3 h cooling delay period. Floret opening was the limiting visual quality characteristic in most treatments. Turgor was more limiting than colour in all observed treatments Using a systems approach a vertically-integrated broccoli handler could project the effects of cooling delays on shelf-life expectations within the prescribed handling system. AS

Pumpkins

1640

Dabrowski (A), Galazka (J) and Zalewski (S). **Technological properties, nutritional value and storage properties of new pumpkin varieties.** *Acta Alimentaria Polonica* 15(2): 1989: 153-159

The purpose of the investigation was to establish technological, nutritional and storage properties of three new pumpkin var. developed genetically at the Faculty of Horticulture, Warsaw Agricultural University, as compared to those traditionally grown in Poland, Melon Yellow (*Melonowa Zolta*) var. AS

Tomatoes

1641

Efiuvwevwere (BJO) and Uwanogho (GU). **Effects of packaging materials following ethanol and benomyl treatments on chemical and microbiological changes in tomato (*Lycopersicon esculentum*) fruits.** *Journal of the Science of Food and Agriculture* 52(3): 1990: 393-402

The effects of various post-harvest treatments on chem. changes, microbiological quality and

occurence of spoilage in ripe tomatoes (*Lycopersicon esculentum* L) were investigated. Fruits were pretreated in 70% ethanol or 0.2% benomyl before being packaged in low density polyethylene (LDPE), high density polyethylene (HDPE) or raffia palm basket. Fruit was stored at 27-32 C for 16 days. Control fruits (without pretreatment or packaging) showed the highest increase in pH; basket-packaged fruits were erratic but LDPE- and HDPE-packaged fruits showed gradual increases. Changes in titratable acidity were the inverse of those in pH. Among packagings, LDPE most effectively maintained total soluble solids (TSS) as compared with basket-packaged fruits, and the control showed the lowest TSS. Of the pretreatments, benomyl-treated fruits retained higher TSS. *Aspergillus* spp, *Penicillium* spp, *Pseudomonas* spp and *Escherichia* spp occurred most commonly in control and basket-packaged fruits, but *Rhizopus* spp and *Leuconostoc* spp predominantly occurred in LDPE- and HDPE-packaged fruits. Microbial load was lowest in benomyl-treated fruits followed by ethanol-treated and control fruits. Spoilage was higher (53.1%) in ethanol-treated than in benomyl-treated (43.8%) fruits. AS

1642

Rodrigo (M), Giner (V) and Martinez (A). **Quality study of canned crushed tomatoes.** *Revista de Agroquimica Y Technologia de Alimentos* 30(1): 1990: 83-92 (Es)

Tomato pastes

1643

Karatas (S) and Esin (A). **A laboratory scraped surface drying chamber for spray drying of tomato paste.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 354-357

A lab. bench-top scraped surface spray dryer chamber was designed and tested to obtain tomato powder from paste (15% w/w). The research parameters were the feed rate of the paste (105 - 260 ml/h), inlet air temp. (100 - 160 C), air flow rate through the chamber (12 - 28 m^3 /h) and the nozzle (0.2 - 0.8 m^3/h), and the rotational speed of the scraper blades. It was found that the yield and quality of the produced tomato powder was highly improved with the introduction of the blades into the drying chamber. Furthermore, changing the construction material from glass to cast iron enabled operation at lower temp. AS

FRUITS

1644

Nahar (N), Rahman (S) and Mosihuzzaman (M). **Analysis of carbohydrates in seven edible fruits of Bangladesh.** *Journal of the Science of Food and Agriculture* 51(2): 1990: 185-192

Dry matter, ash, lignin, starch and soluble and insoluble dietary fibre contents of the edible parts of seven fruits of Bangladesh were determined. Analysis of low mole. wt. carbohydrates showed that all the fruits, except lukluki and hogplum, contained substantial amounts of these materials of which glucose and fructose were the main components. The main constituent of the polysaccharides in all the fruits was glucose. The dietary fibre contents of the dry fruits ranged from 29 - 79%. Lukluki has by far the best combination of low free sugars and high dietary fibre, and pineapple the worst. AS

1645

Ramteke (RS), Eipeson (WE) and Patwardhan (MV). **Preparation and properties of aroma concentrates from some tropical fruit juices and pulps.** *Journal of Food Science and Technology (India)* 27(5): 1990: 277-279

A pilot plant model aroma recovery unit (Holstein and Kappert, W. Germany) was used for the preparation of aroma conc. from some tropical fruit juices and pulps. The effect of some operating variables like vacuum, reflux ratio and condenser temp. on aroma recovery was studied. Operating the unit closer to atmospheric pressure and low condenser temp. was found to minimise loss of aroma volatiles. High reflux ratios increased the strength of aroma conc. prepared. AS

1646

Katiyar (SK), Sharma (K), Kumar (N) and Bhatia (AK). **Composition of some unconventional Himalayan wild fruits.** *Journal of Food Science and Technology (India)* 27(5): 1990: 309-310

Fifteen species of unconventional wild fruits are identified and collected for documentation and chem. examination during survey of food habits of tribals residing in North-Western Himalayan range. Next to water component, the fruits are rich in sugars (9.95 - 35.42%) and mineral matter (0.5 - 4.7%). K, Ca, Fe and P contents varied from 34 to 998, 51 to 671, 2 to 160 and 3 to 201 mg/100g fruit pulp, resp. Fruits of *Rosa macrophylla* (769 mg/100g), *Rosa webbiana* (751 mg/100g) and *Hippophae rhamnoides* (509 mg/100g) are rich source of vitamin C content. *Artocarpus lakoocha* fruits are used in making chutney and as pickle while sun-dried *Diospyros lotus* fruits are used throughout the yr by local hill communities. AS

1647

Marchal (J) and Nolin (J). **Fruit quality. Pre and post-harvest physiology.** *Fruits* 119-122; 1990 (Fr)

1648

Paroz (PR). **Tropical fruits as food ingredients.** *Food Australia* 42(6); 1990; 273-275

This article covers briefly the potential of various tropical fruits for commercial processing. Pineapple, mango, papaya, passion fruit, banana, guava, coconut, lime, melon, lychee and minor fruits and potential products are discussed. BV

Apples

1649

Videv (K), Tanchev (S), Sharma (RC) and Joshi (VK). **Effect of sugar syrup concentration and temperature on the rate of osmotic dehydration of apples.** *Journal of Food Science and Technology (India)* 27(5); 1990; 307-308

The effect of different concn. of sugar solution viz. 60 to 75%, different temp. i.e. 40 to 80 C for different durations (0.5 to 4.5 h) on the rate of osmosis of apple slices (d = 20 mm and ht = 15 mm) is reported here. Based on these results, an emperical equation was derived which can predict rate of osmosis (F), percentage of dehydration of any given fruit slices of specific size, time (T), given concn. of sugar (%B) and temp. (t) in the above referred parameters. AS

Bananas

1650

Cano (P), Marin (MA) and Fuster (C). **Effects of some thermal treatments on polyphenoloxidase and peroxidase activities of banana (*Musa cavendishii* var Enana).** *Journal of the Science of Food and Agriculture* 51(2); 1990; 223-231

Polyphenoloxidase (EC 1.14.18.1) and peroxidase (EC 1.11.1.7) activities were evaluated during cold storage of banana. The effects of some thermal treatments (blanching of peeled bananas, microwave treatment of banana slices and storage of banana slices at -24 C) were studied. Inactivation of both enzymes by blanching was very effective (96 - 100%) at all maturity levels. Microwave treatment showed differing efficiency depending on banana ripeness, and produced non-enzymic darkening due to Maillard reactions mainly in green and full-yellow bananas. Freezing of fruit slices without previous thermal treatment produced different effects in polyphenoloxidase and peroxidase activities. It was concluded that immersion in boiling water of peeled bananas with 70% green/30% yellow peel colour maturity index is the optimal pretreatment for the preservation of frozen banana slices. AS

Citrus fruits

1651

Wild (BL). **Hot dip treatments reduce chilling injury during storage of citrus fruits at 1 C.** *CSIRO Food Research Quarterly* 50(2); 1990; 36-41

Dates

1652

Yousif (AK), Abou Ali (M) and Bou Idreese (A). **Processing, evaluation and storability of date jelly.** *Journal of Food Science and Technology (India)* 27(5); 1990; 264-267

Results of the organoleptic and chem. evaluation revealed the possibility of processing date jelly of good quality. The pH of the fresh jelly was 3.57 whereas its Brix and water activity were 73.3 and 0.75 resp. Storage up to 6 months had a slight effect on the moisture and water activity and a moderate effect on the pH, colour and sugar content of the date jelly. No significant differences were found between the scores of the date jelly stored for 0, 2, 4 and 6 months when compared with the imported jelly. These results highlight the possibility of storing date jelly up to 6 months without affecting their good quality attributes. AS

Guava

1653

Pino (J), Gutierrez (S) and Rosado (A). **Volatile constituents from a guava (*Psidium guajava* L.) natural flavour concentrate.** *Die Nahrung* 34(3); 1990; 279-282

The volatile constituents of a commercially produced guava natural flavour conc. were isolated by simultaneous distillation-extraction with diethyl ether. The resultant essence was analyzed by capillary gas chromatography and GC-MS technique. A total of 29 compounds was identified, from which 10 substances could be described for the first time as guava fruits constituents. AS

Litchi

1654

Agarwal (N) and Nirankar Nath. **Effect of pretreatments on quality characteristics and water activity of air-dried litchis (*Litchi chinensis* Sonn.) cv. rose scented.** *Die Nahrung* 34(3); 1990; 255-263

The effect of pretreatments on the quality of dried litchis was studied. Dried whole litchis were brown, blanching in boiling water reduced browning but colour was still disliked. Peeling and destoning fruits before drying gave superior product (extent of browning or EB: 0.27, mean sensory score or MSS: 6.74) and they dried faster. Pre-drying dip of peeled and destoned litchis for 10 min in 2% Na_2SO_3 + 1% sodium metabisulphite at room temp. improved colour (EB 0.03) but reduced MSS (5.80). Litchis syruped in 40% syrup containing 0.5% citric acid and 3000 ppm SO_2 for 30 days gave best dried product (EB: 0.08, MSS: 8.08). They dried faster for first 4 h after which untreated peeled and destoned (control) litchis dried faster. Dried syruped litchis were hygroscopic, water activity for product of 11.1% moisture (moisture free basis) was 0.27 and critical moisture content was 20 g water/100 g solids. AS

Oro

1655

Lasekan (OO). **Effect of calcium on the storage life of oro (*Antiaris africana*).** *Journal of the Science of Food and Agriculture* 51(2): 1990: 281-284

The effects of Ca on the ascorbic acid, chlorophyll, titratable acidity and texture (firmness) of stored oro (*Antiaris africana* (Mill)) fruits (av. wt 100 g) were studied. Three groups of the fruits were dipped in 20 g litre $^{-1}$, 40 g litre $^{-1}$ calcium chloride solutions and deionised water resp. for 10 min. The fourth group, which was untreated, served as the control and was also packaged in heat-sealed cellophane bags. The fruits were displaced and stored at ambient temp. (28 plus or minus 2 C). The Ca-treated fruits which kept better were firmer and had a slight colour change (chlorophyll) which also produced a progressive increase in ascorbic acid level during storage. The titratable acidity of the fruits did not fluctuate as significantly as that of the untreated (control) fruits. AS

Pears

1656

Shiota (H). **Changes in the volatile composition of La France pear during maturation.** *Journal of the Science of Food and Agriculture* 52(3): 1990: 421-429

Volatile constituents were separated from fully ripe La France pear by using simultaneous distillation and extraction. The principal volatile components were ethyl, propyl, butyl and hexyl acetates, which accounted for 70.6%. Hex-5-enyl acetate was detected as an interesting component and probably contributes to the ketonic estery odour of this pear. The changes in the comp. of volatile components during maturation were also investigated. The concn. of the esters, especially acetates, increased markedly with increasing maturity of the fruit. These results were compared with those obtained from Bartlett pear. AS

Plums

1657

Wani (MA) and Saini (SPS). **Processing of plums.** *Journal of Food Science and Technology (India)* 27(5): 1990: 304-306

Method of extraction of juice from plum (*Prunus salicina* L) was standardised. Pulp and juice yield by hot break method was higher in all 3 var. of plum as compared to cold break process. Addition of water increased the juice yield but reduced the total solid content. Pectinolytic enzyme treatment increased the juice yield but reduced total soluble solids, total solids, pectin and relative viscosity of the juice. AS

Strawberries

1658

Pesis (E) and Avissar (I). **Effect of postharvest application of acetaldehyde vapour on strawberry decay, taste and certain volatiles.** *Journal of the Science of Food and Agriculture* 52(3): 1990: 377-385

CONFECTIONERY, STARCH AND SUGAR

1659

Barabasz (W), Brzozka (L), Krzeczek (J) and Tomasik (P). **Studies on mutagenicity of caramel.** *Starch/Starke* 42(2): 1990: 69-71

Caramels lab.-prepared by thermolysis of pure α-D-glucose, D-fructose and sucrose as well as of these sugars with some N-containing and N-free catalysts were tested against *Escherichia coli* strains. These caramels exhibit free- radical character independently of the mode of their preparation. Biological functions of *Escherichia coli* in 10 subsequent generations grown without caramel and with caramel added to a nutrient broth were tested in a standard scope of 15 biological tests. Neither growth nor biological functions of all generations of this bacterium were influenced by caramels added. AS

Confectionery

1660

Satyanarayana Rao (TS), Kaverappa (NM), Hemaprakash Reddy (T) and Jayaraman (KS). **Development of ready-to-eat traditional Indian sweet dishes based on jaggery and coconut.** *Journal of Food Science and Technology (India)* 27(6): 1990: 355-358

Traditional Indian sweet meat like *holige* (sweet stuffed chapathi), *modaka* (karji kai) and burfi spoil quickly due to high moisture, improper handling during preparation and packaging. These products with reduced moisture content were developed using dehydrated coconut powder and jaggery and stored for 6 months. These products, without any preservative when packed in paper-Al foil polyethylene laminate pouches were found to be acceptable for a period of 6 months at 19 - 26 C (ambient temp.) and 3 months at 37 C. AS

1661

Satyanarayana Rao (TS), Kaverappa (NM) and Jayaraman (KS). **Development of shelf stable ready-to-eat Indian sweet meats based on sugar and coconut.** *Journal of Food Science and Technology (India)* 27(6): 1990: 359-361

Sugar *holige* (sweet stuffed chapathi) and *modaka* (karji kai) the known traditional Indian sweet meats have a very short shelf-life under normal conditions of preparation and storage. These two products were prepared using normal ingredients like sugar, coconut, copra, semolina, refined wheat flour, vanaspathi and cardamom and were packed in polypropylene and then paper foil Al polyethylene laminate pouches and stored at various temp. These two items were found to be acceptable for a period of two months at 37 C and 4 months at ambient temp., without use of any preservatives. AS

Cocoa

1662

Hosteler (KA), Morrissey (RB), Tarka (SM), Apgar (JL) and Shively (CA). **Three-generation reproductive study of cocoa powder in rats.** *Food and Chemical Toxicology* 28(7): 1990: 483-490

Male and female Sprague-Dawley rats were continuously exposed to dietary cocoa powder levels of 0.0, 1.5, 3.5 or 5.0% for three generations. During the initial 12-wk growth periods for the F_{0}-, F_{1b}- and F_{2b}-generation rats, mean methylxanthine exposures (mg/kg/day) for males/females were 30/36, 72/86 and 104/126 for the 1.5, 3.5 and 5.0% cocoa powder groups, resp. No consistent dose-related effects on any of the monitored reproductive indices (mating, fertility, conception, gestation, viability or lactation) were noted over three generations. Minor reductions in mean body wt. relative to controls at wk 12 were observed in male rats exposed to 3.5 or 5.0% cocoa powder and female rats exposed to 5.0% cocoa powder in the F_{1b} and F_{2b} generations. Renal tubular mineralization in the F_{0}-generation male rats in the 5.0% cocoa powder group was the only statistically elevated histomorphological lesion observed. Plasma cholesterol concn. in F_{1b}-generation rats wereelevated but cocoa powder did not affect this parameter consisting across multiple generations. Thus, continuous cocoa powder consumption by rats at levels as high as 5.0% of the diet was without effect on reproductive capacity under conditions of a standard three-generation evaluation. AS

Jellies

1663

Riedel (HR). **'Single shot' filled jelly fruits.** *Confectionery Production* 57(1): 1991: 686-687

The processing of filled jellies is described. The types of filling materials also are mentioned. The methods of preparation of jellies using agar agar and pectin are described. The method of depositing with specialised 'one shot' depositors is also described. SYR

Starch

1664

Saley (E) and Ciacco (CF). **Production and properties of starch phosphates produced by the extrusion process.** *Starch/Starke* 42(1): 1990: 15-17

Corn starch was phosphated on a Brabender single screw extruder at different extrusion temp., sodium tripolyphosphate (STP) concn. and pH of the medium. The higest degree of substitution (DS) was obtained at extrusion temp. of 200 C, STP concn. equal or superior of 1.4 g/100mL of water and pH of 8.5. The DS was related to paste clarity while the extrusion process, to the water absorption index and water solubility index, independently of the DS. AS

Sugar

1665

Huh (KT), Toba (T) and Adachi (S). **Oligosaccharide formation during the hydrolysis of lactose with hydrochloric acid and cation exchange resin.** *Food Chemistry* 38(4): 1990: 305-314

1666

John (T), Lailach (S), Nebelung (M) and Tscheuschner (H-D). **Fluidized bed drying of bread and biscuit crumbs.** *Journal of Food Engineering* 12(1): 1990: 29-43

1667

Lopez (L), Wittig (E), Craddock (M) and Wainer (C). **Manufacture of a low calorie baked pastry: Jam roll.** *Revista de Agroquimica Y Technologia de Alimentos* 30(1): 1990: 122-129 (Es)

A new formula of low caloric baked pastry was designed, improved and manufactured. The studied product was a jam roll, made of a thin biscuit layer covered with jam and rolled. A total substitution of a sweetener mixture for sucrose was made. Physicochemical characteristics and the microbiological quality of raw materials were analyzed. In the optimized product, the chem. comp., caloric value, microbiological quality and acceptability by obese patients were evaluated. In the low calorie pastry, higher levels of moistures, ashes, proteins and lipids were obtained. A decrease in the non-nitrogenous extract and total carbohydrates was observed. The caloric value was reduced 24.9%. Good microbiological quality and acceptability by obese patients were observed. AS

Biscuits

1668

Talbot (G). **Fat migration in biscuits and confectionery systems.** *Confectionery Production* 56(4): 1990: 265-272

The products where fat migration occur include chocolate coated biscuits and wafers with cream fillings, filled chocolate bars and prolines and also custard cream type products. The effects of fat migration, the mechanism, measurement and prevention of fat migration are described. SYR

Bread

1669

Gan (Z), Angold (RE), Williams (MR), Ellis (PR), Vaughan (JG), Galliard (T). **The microstructure and gas retention of bread dough.** *Journal of Cereal Science* 12(1): 1990: 15-24

1670

Westerlund (E), Andersson (R), Aman (P) and Theander (O). **Effects of baking on water-soluble non-starch polysaccharides in white bread fractions.** *Journal of Cereal Science* 12(1): 1990: 33-42

Cakes

1671

Shrestha (N), Vali (SA) and Choudhary (PN). **Quality characteristics of cakes prepared from different fats and oil.** *Journal of Food Science and Technology (India)* 27(6): 1990: 400-401

The effect of different fats and oil on sp. gr. and viscosity of cake batters and consequently the volume and tenderness of baked cake was studied. Batters with low sp. gr. and high viscosity produced cakes with greater volumes. No correlation could be established between sp. gr. of cake batters and tenderness of baked cakes. Sensory evaluation showed variation in the condition of top crust, tenderness and flavour of cakes prepared from different fats and oil. AS

Pasta

1672

De Stefanis (E) and Sgrulletta (D). **Effects of high-temperature drying on technological properties of pasta.** *Journal of Cereal Science* 12(1): 1990: 97-104

Tortillas

1673

Bressani (R). **Chemistry, technology, and nutritive value of maize tortillas.** *Food Reviews International* 6(2): 1990: 225-264

Covers the consumption of processed maize, form of consumption, the technology (as practiced in rural areas, industrial technology and technological modifications), physico-chemical characteristics of maize for tortilla (preparation and the role of lime in the process, chemical and nutritional changes resulting from processing, nutrient availability), other effects of the lime-cooking process on maize (lysinoalanine formation, mycotoxins and alkaline-cooking of maize, microbiological aspects of tortilla and tortilla flour) supplementation of nutritional quality (supplementation with amino acid, protein source, green vegetables, and other grains), and physico-chemical characteristics and other uses. 150 references. SRA

1674

Patel (DA) and Sannabhadti (SS). **Emerging pathogens in dairy products - a review.** *Indian Dairyman* 43(5): 1991: 213-223

In recent yr increased food borne disease outbreaks have been caused by *Yersinia enterocolitica*, *Listeria monocytogenes* and *Campylobacter jejuni*. Detailed description of these organisms have been separately given which includes incidence of disease, transmission, taxonomy, sources of contamination, physical, cultural and biochemical characteristics and their occurence in different dairy products. Control measures have alsc been listed. SRA

1675

Siva (CV), Upadhyay (KG) and Sannabhadti (SS). **Lactoperoxidase/thiocyanate/H $_2O_2$ system, its uses and implications in manufacture of dairy products.** *Indian Dairyman* 43(5): 1991: 240-246

Describes the LP-system (Lactoperoxidase/thiocyanate/H $_2O_2$ system), its basic mechanism of action, effect on constituents, microbes and shelf-life, implications of LP-system on dairy product manufacture including acidophilus milk, cultured butter milk, dahi, yoghurt, Cheddar cheese, cottage cheese, fresh type cheese, pickled soft cheese, Camembert cheese, Mozzarella cheese and ghee. Possible health hazards associated with LP-system has also been described. SRA

1676

Kang (Y-J) and Frank (JF). **Characteristics of biological aerosols in dairy processing plants.** *Journal of Dairy Science* 73(3): 1990: 621-626

Milk

1677

Franzen (K), Singh (RK) and Okos (MR). **Kinetics of nonenzymatic browning in dried skim milk.** *Journal of Food Engineering* 11(3): 1990: 225-239

The kinetics of nonenzymatic browning (NEB) of skim milk samples containing 3.5 to 50% moisture was measured in the temp. range of 35 - 130 C. The kinetic data were used to develop a model for describing the rate of NEB in skim milk as function of temp. and moisture content. It was found that the browning rate was zero order after an initial lag period and that the temp. dependency of NEB satisfied the Arrhenius relationship. The NEB rate increased as temp. increased, as exposure time to heat treatments increased, and as moisture content increased to a certain browning-critical moisture (7% dry wt.). AS

1678

Kalogridou-Vassiliadou (D). **Sources of evaporated milk contamination by 'Flat Sour' bacilli.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 285-288

The sources of evaporated milk contamination by microorganisms that cause flat sour spoilage were studied at different stages of processing and in different ingredients used for the standardization of the milk. Raw milk, skim milk powder and homogenized milk were found to be highly contaminated by spore-forming bacteria and from these samples *Bacillus coagulans*, *B. licheniformis*, *B. subtilis* and *B. macerans* were isolated more frequently. Milk samples, from evaporator, storage tank, and from cans, after filling and sealing and after sterilization and cooling, were found to be contaminated with all these microorganisms, except *B. macerans*. Measures for the prevention of this contamination were discussed. AS

1679

Gaines (TP), West (JW) and McAllister (JF). **Determination of calcium and phosphorus in milk.** *Journal of the Science of Food and Agriculture* 51(2): 1990: 207-213

A fast, accurate method for determining Ca and P in milk was developed. A 1-ml samples of milk was ashed without pre-drying for 1 h and the diluted HCl extract was used for the detn. of Ca by AAS and P by colorimetry with measurement of the phosphomolybdenum blue complex at 880 nm for max sensitivity. Results were in good agreement with those found for 2 h ashing with or without the preliminary step for evaporating to dryness prior to ashing. Recovery ranged from 101.3 to 102.0% for Ca and 99.1 to 100.1% for P when 1 ml sample of milk was spiked with a 1-ml aliquot of a $CaHPO_4$ standard solution and analysed by the method. The method had a precision of approx. 1.0% coeff. of variation for both Ca and P in milk and in $CaHPO_4$ standard solution. AS

1680

Moti Ram and Joshi (VK). **Effect of addition of buffalo milk proteose and proteose-peptone components 3, 5 and 8 on the whippability of cream.** *Journal of Food Science and Technology (India)* 27(5): 1990: 314-316

Addition of buffalo milk proteose (BP) and proteose-peptone (BPP) components 3, 5 and 8 like fractions to both cow's and buffalo creams did not reveal any appreciable change in the whippability

upto an added concn. of 2.0 mg/ml. Cow's milk cream attained lower whippability (64.3%) in comparison with buffalo milk cream (93.7%) under identical conditions of processing. AS

1681

Deepa Pande and Mathur (MP). **Evidence for the presence of a lipoprotein lipase in ultra heat treated bovine milk and its ionic binding to heparin.** *Journal of Food Science and Technology (India)* 27(6): 1990: 382-384

Raw bovine milk was ultra heat treated (UHT) at 140 C for 14 sec and packed in laminated pouches. The residual lipase activity was determined using different assay systems. The complete inefficacy of 'enzyme-substrate-buffer' system indicated that the enzyme requires certain co-factors for its optimum activity. Using five different assay systems, it was observed that blood serum is an indispensable component of the system, heparin is a stimulant and NaCl is an inhibitor thus establishing that the enzyme present in UHT milk is a lipoprotein lipase. The enzyme was purified using DEAE-cellulose chromatography followed by affinity chromatography on heparin sepharose-4B gel. A single broad peak with a fold purification of 279.48 was obtained on DEAE-cellulose column whereas two very sharp peaks showing fold purifications 0f 2333.31 and 825.37 resp. were obtained on heparin sepharose 4B column. AS

1682

Nsofor (LM). **Non-coagulability of cow's milk with chymosin.** *Journal of Food Science and Technology (India)* 27(6): 1990: 385-387

The production trend of non-coagulating milk by individual cows was monitored in a Holstein herd. A new method (coagulation efficiency) was developed to categorize the suitability of milk samples collected periodically from these cows for cheese making. The frequency of occurrence of non-coagulating milk with chymosin ranged from 0 to 54% at different periods of the year. 68% of the cows sampled produced non-coagulating milk at least once during the test period. Milk samples from 13 cows, that is 38% of those that produced non-coagulating milk had coagulation efficiencies below 40%, and they exhibited the greatest losses of cheese solids in whey. Milk having less than 40% coagulation efficiency should not be used for cheese making. A negative relationship existed between coagulation efficiency and cheese solids loss in whey, and milk samples which had greater coagulation efficiencies exhibited lower losses. AS

1683

Toba (T), Hayasaka (I), Taguchi (S) and Adachi (S). **A new method for manufacture of lactose-hydrolysed fermented milk.** *Journal of the Science of Food and Agriculture* 52(3): 1990: 403-407

Lactose-hydrolysed fermented milk was manufactured by sonication in the course of fermentation. The milk was inoculated with *Lactobacillus delbrueckii* subsp *bulgaricus* or *L helveticus*, incubated for 4 h, sonicated, and incubated for an additional 12 h. The sonication resulted in 71-74% depletion of the initial lactose whereas 39-51% lactose hydrolysis was obtained in non-sonicated milk. AS

1684

Anon. **Development of the milk can.** *Food Trade Review* 60(8): 1990: 434,436

1685

Xiansheng (W), Hung (TV), Drew (PG) and Versteeg (K). **Enzymatic degradation of cholesterol in milk.** *Australian Journal of Dairy Technology* 45(2): 1990: 50-52

The degradation of cholesterol and formation of oxidation products by cholesterol oxidase was studied in a buffer system and in milk at a range of temp. In a buffer system at 25 or 37 C, the cholesterol was removed completely in less than 24 h. In homogenized, pasteurized milk, the cholesterol concn. could be halved at 25 C and lower temp. The best results were obtained at 3 and 7 C. At these temp., the cholesterol concn. was halved within 10 h. In milk, the concn. of the cholesterol oxidation product, 4-cholesten-3-one, decreased after about 24 h. AS

1686

Urbach (G). **Headspace volatiles from cold-stored raw milk.** *Australian Journal of Dairy Technology* 45(2): 1990: 80-85

When raw milk was stored at refrigeration temp., volatile carbonyls were reduced to the corresponding alcohols. Some of these carbonyls, such as acetone, were present in the fresh milk. Others were formed from the corresponding amino acids, for example 3-methylbutanal from leucine. The most abundant alcohols were ethanol, propan-2-ol and 3-methylbutan-1-ol. On further storage the alcohols were partially esterified with volatile acids. Sulphur compounds, for example dimethyl disulphide and 2,4-dithiapentane, were also formed. At the same bacterial cell count, the off-flavour and volatiles production was much greater at 7 C than at 2 C. The proportions of volatiles formed varied with the source of the milk. Headspace volatiles

from cold stored raw milk and bacterial populations increased in parallel. AS

Milk products

1687

Pauletti (M), Venier (A), Sabbag (N) and Stechina (D). **Rheological characterization of Dulce de Leche, a confectionery dairy product.** *Journal of Dairy Science* 73(3): 1990: 601-603

1688

Hough (G), Martinez (E), Contarini (A) and . **Sensory and objective measurement of sandiness in Dulce de Leche, a typical Argentine dairy product.** *Journal of Dairy Science* 73(3): 1990: 604-611

Butter

1689

Fearon (AM) and Johnston (DE). **A comparison of three instrumental techniques to evaluate butter spreadability.** *Journal of Food Quality* 12(1): 1989: 23-38

1690

Karmas (R) and Kleyn (DH). **Determination and interpretation of alkaline phosphatase activity in experimental and commercial butters.** *Journal of Dairy Science* 73(3): 1990: 584-589

Cheese

1691

Marcos (A), Esteban (MA) and Alcala (M). **Determination of water activity in Brie and Camembert cheese varieties by four different methods.** *Food Chemistry* 38(3): 1990: 189-199

1692

Aleandri (R), Buttazzoni (LG), Schneider (JC), Caroli (A) and Davoli (R). **The effects of milk protein polymorphisms on milk components and cheese-producing ability.** *Journal of Dairy Science* 73(2): 1990: 241-255

1693

Abrahamsen (RK), Birkeland (SE) and Langsrud (T). **Acceleration of cheese ripening by the use of lac-mutants of group N-streptococci.** *Acta Alimentaria Polonica* 15(2): 1989: 123-131

The paper presents the results indicating the possibility of reduction of the ripening period of cheese by one month using starter based of Lac -mutants of group N-3 treptococci in addition to ordinary cheese starter. Schemes for preparation of Lac -starters are given. AS

1694

Jameson (GW). **Cheese with less fat.** *Australian Journal of Dairy Technology* 45(2): 1990: 93-98

There are marketing opportunities for cheeses with lower fat contents but to be successful it is essential that such cheeses be organoleptically acceptable. The effects of fat on cheese structure, texture and flavour are considered, with emphasis on the consequences of reducing the fat content of cheese. The regulations which govern the fat content of cheese in Australia are surveyed broadly with reference to lowering fat levels. The technological opportunities for making lower-fat cheeses of specific var. are then canvassed within the constraints presented by regulatory requirements and the fundamental physical, chem. and sensory properties of cheese. Finally, some economic cosequences of manufacturing lower-fat cheeses are briefly discussed using an example indicating that overall returns are not necessarily improved and may in fact decline. AS

Cheddar cheese

1695

Jha (YK) and Singh (S). **Effect of additives and *Lactobacillus casei* on flavour development in Cheddar cheese from buffalo milk.** *Journal of Food Science and Technology (India)* 27(5): 1990: 268-271

Acceleration of flavour development during ripening process of Cheddar cheese was studied. The addition of sodium citrate and sodium bicarbonate to milk failed to accelerate the flavour development. Supplementation of milk with *Lactobacillus casei* at 0.5% level along with the normal starter bacteria culture accelerated flavour development which was correlated with glycolysis, proteolysis and lipolysis during ripening. AS

1696

Kanawjia (SK) and Singh (S). **Effect of protease on flavour development and biochemical changes in buffalo milk Cheddar cheese.** *Journal of Food Science and Technology (India)* 27(6): 1990: 362-364

Attempts were made to enhance the ripening process of buffalo milk Cheddar cheese by addition of protease enzyme. Protease, 0.005, 0.010 and 0.025% (W/W of curd) were added in milled curd along with salt. The flavour development and biochemical changes in cheeses with added protease were faster than in those without protease. A level

of 0.010% protease addition resulted in getting best cheese. AS

1697

Mcgregor (JU) and White (CH). **Optimizing ultrafiltration parameters for the development of a low-fat Cheddar cheese.** *Journal of Dairy Science* 73(2): 1990: 314-318

1698

Mcgregor (JU) and White (CH). **Effect of enzyme treatment and ultrafiltration on the quality of low-fat Cheddar cheese.** *Journal of Dairy Science* 73(3): 1990: 571-578

1699

Hayashi (K), Revell (DF) and Law (BA). **Effect of partially purified extracellular serine proteinases produced by *Brevibacterium linens* on the accelerated ripening of Cheddar cheese.** *Journal of Dairy Science* 73(3): 1990: 579-583

1700

Broome (MC) and Hickey (MW). **Comparison of fermentation produced chymosin and calf rennet in Cheddar cheese.** *Australian Journal of Dairy Technology* 45(2): 1990: 53-59

Cheddar cheese was manufactured in 3 trials in order to compare fermentation-produced chymosin (CHY-MAX, Pfizer Pty Limited) and calf rennet. Results covering manufacturing data, cheese comp., bacterial populations, cheese yields, chymosin activity, proteolysis and organoleptic assessment over a 12-month maturation period are presented. No differences of practical consequence were evident in the manufacturing, compositional, microbiological and proteolytic analyses of the cheeses. A significant increase ($P>0.025$) in cheese yield with respect to total mass and total solids was obtained with the use of the fermentation produced coagulant but this result should be viewed with caution until further trials are carried out. The fermentation produced coagulant also appeared to be more resistant as measured by residual chymosin activity to the conditions of Cheddar cheese manufacture. Further, the cheese made with the fermentation produced coagulant was graded equal to or better than the cheese made with the control coagulant at 3,6 and 12 months. AS

1701

Broome (MC), Krause (DA) and Hickey (MW). **The isolation and characterization of lactobacilli from Cheddar cheese.** *Australian Journal of Dairy Technology* 45(2): 1990: 60-66

Lactobacillus plantarum and subspecies of *Lactobacillus casei* were isolated from good quality Cheddar cheese and characterized with respect to metabolic functions that would allow their use in cheesemaking. The isolates did not grow, produce significant levels of lactic acid or were not excessively proteolytic under conditions similar to those occurring during the vat stage of manufacture. The organisms grow at low temp. and in the presence of NaCl. Further, they oxidize substrates present in Cheddar cheese and continue to produce PTA-soluble amino N as stationary cells. The organisms can also be grown in large numbers and are readily harvested from artificial media. However, both organisms have the ability to metabolize citrate, a potential problem with respect to cheese manufacture. AS

1702

Broome (MC), Krause (DA) and Hickey (MW). **The use of non-starter lactobacilli in Cheddar cheese manufacture.** *Australian Journal of Dairy Technology* 45(2): 1990: 67-73

Non starter lactobacilli were added in high numbers ($10^{6/cfu\ g^{-1}}$) to Cheddar cheese at the vast stage of manufacture. The lactobacilli did not affect the rates of growth and acid production of the starter organisms and other cheesemaking parameters. They remained at high levels throughout maturation, dominating the non starter microflora of the cheese to the exclusion of naturally occurring organisms. While the lactobacilli did not metabolise citrate or lead to the formation of biogenic amines, protein catabolism rates, particularly with respect to peptide degradation, were increased as was flavour development and intensity. It was observed that the body and texture of the cheese was unaffected by the treatment. AS

Swiss Gruyere cheese

1703

Imhof (R), Isolini (D) and Bosset (JO). **Differences between homofermentative and heterofermentative Lactobacilli with respect to the production of some volatile flavour components in Swiss Gruyere cheese and in culture supernatants.** *Lebensmittel-Wissenschaft und - Technologie* 23(3): 1990: 305-311

Chhana spread

1704

Tewari (BD), Sachdeva (S) and Singh (S). **Chhana spread - easy to manufacture.** *Indian Dairyman* 43(5): 1991: 231-233

Chhana/paneer (acid coagulated milk product) spread is prepared by breaking chhana into small pieces and transferring to domestic mixer, and water is added and ground to form paste. Moisture content of the final product is maintained to 62% in cow chhana spread, and 64% in buffalo channa spread. Salt is added at 1 - 1.5% during grinding; an acidifying agent is added to lower the pH of spread slightly to 5.1 - 5.0. This product will have the bland taste. The bland flavour could be eliminated by the addition of chakka or ripened cheese. To 70 g of channa 30 g chakka is added and mixed in a mixer. Salt at the rate of 1.0 - 1.5% is added. Spices like mint, coriander, ginger, garlic could also be added, if necessary. This is packed in polystyrene cups, which has a shelf-life of about 8-10 days under refrigerated storage. The proximate comp. of cow and buffalo channa spread is presented in tabular form. SRA

Curd

1705

Sanyal (MK), Yadav (PL) and Dubey (PC). **Use of preservatives for improving shelf-life of curd (dahi).** *Journal of Food Science and Technology (India)* 27(6): 1990: 388-389

A technique for the production of curd (dahi) with improved shelf-life has been developed. Results of sensory evaluation revealed that dahi stored at 30 plus or minus 2 C and 4 plus or minus 2 C were acceptable upto 20 days and 45 days resp. while control samples of dahi kept good only for 2 days and 7 days resp. Titratable acidity and pH of dahi samples did not change significantly during storage. Storage period had significant influence on physical appearance body and texture, aroma and overall acceptability of dahi samples stored at 30 plus or minus 2 C but did not show any significant effect on the sensory attributes of dahi stored at 4 plus or minus 2 C. AS

Ice cream

1706

Venkateswarlu (JP), Sastri (PM), Rao (MR) and Ranganadham (M). **Studies on the physical and chemical properties of ice creams formulated with different substitution levels of arrowroot powder for milk solids-not-fat.** *Journal of Food Science and Technology (India)* 27(6): 1990: 390-391

Replacement of milk solids-not-fat (SNF) with arrowroot powder at 20, 40 and 60% in soft serve ice cream indicated that replacement at multiple levels of 29% increased the pH, relative viscosity and melt down duration values and decreased the titratable acidity, sp. gr., protein content and over-run percentage values. It was observed that arrowroot powder could satisfactorily replace milk SNF upto 40% without impairing organoleptic qualities with a reduction of 12.04% cost of production. AS

Paneer

1707

Nakazawa (Y), Yamada (M) and Wada (R). **Low-sodium paneer produced from unfermented and fermented cow's milk.** *Lebensmittel-Wissenschaft und - Technologie* 23(4): 1990: 336-339

The manufacture of the milk curd product, paneer, with low-sodium content, as brought about by ion exchange, was investigated. A comparison was made of regular unfermented paneer produced instantly by acidification and fermented paneer. The yields and mineral migrations were dependent on the changes of coagulation and texture resulting from the fermentation or cooking conditions. There were similarities in the concn. and distribution of amino acids and lower-mole. wt. peptides between the controlled and low-sodium fermented paneer. It was possible to obtain whole milk paneer with reduced sodium content of 21-23 mg/kg without affecting the alkali earth metal concn. AS

Wheys

Whey proteins

1708

Paulsson (M) and Dejmek (P). **Thermal denaturation of whey proteins in mixtures with caseins studied by differential scanning calorimetry.** *Journal of Dairy Science* 73(3): 1990: 590-600

Yoghurts

1709

Rysstad (G), Knutsen (WJ) and Abrahamsen (RK). **Effect of threonine and glycine on acetaldehyde formation in goats' milk yoghurt.** *Journal of Dairy Research* 57(3): 1990: 401-411

MEAT AND POULTRY

Meat

1710

Babiker (RB), Patterson (JT) and Damoglou (AP). **Changes in carbohydrates and free amino acids**

caused by the growth of pure cultures of spoilage bacteria on meat drip. *Journal of Food Science and Technology (India)* 27(5): 1990: 272-277

The influence of certain meat isolates when inoculated into sterile meat drips was studied. Analyses were carried out on the bacterial count, carbohydrate (glucose, glucose 6-phosphate, lactic acid) contents and amino acid levels. The isolates examined showed three different patterns in utilizing carbohydrates. *Pseudomonas* I and II utilized glucose, *Serratia liquefaciens* preferentially utilized glucose 6-p and *Moraxella*-like organism utilized glucose 6-p and glucose simultaneously. The levels of lactic acid were noted to fluctuate. *Pseudomonas* II was able to utilize the amino acid taurine. *Moraxella*-like organism attacked a different group of amino acids which were not really attacked by the other test organism. Little changes were observed in the levels of amino acids in *Serratia liquefaciens* inoculated samples. AS

Beef

1711

Seideman (SC), Cross (HR) and Crouse (JD). **Variations in the sensory properties of beef as affected by sex condition, muscle and postmortem aging.** *Journal of Food Quality* 12(1): 1989: 39-58

1712

Dickson (JS). **Survival and growth of *Listeria monocytogenes* on beef tissue surfaces as affected by simulated processing conditions.** *Journal of Food Safety* 10(3): 1990: 165-174

1713

Anderson (ME). **Reducing microbial population of beef tissues: Concentration and temperature of lactic acid.** *Journal of Food Safety* 10(3): 1990: 181-190

1714

Sharma (N), Keshri (RC) and Gandemer (G). **Effect of cooking on lipid composition of buffalo bone marrow.** *Journal of Food Science and Technology (India)* 27(6): 1990: 365-367

Samples of femur marrow of buffalo were analysed for total, neutral and phospholipids (TL, NL and PL). Effect of cooking of bones on lipids and their fatty acid comp. were determined. Major lipid was triglyceride (TG) in femur marrow. In PL fraction, phosphatidyl choline (PC) and phosphatidyl ethanolamine (PE) were predominant. Bone marrow contained 42-46% saturated fatty acids of which the major components were palmitic and stearic acids. Monounsaturated fatty acids (50-56%) comprised mainly of oleic and palmitoelic acids. The polyunsaturated fatty acid (PUFA) contents were limited to 1% in TL and 3% in PL. Linoleic and linolenic acids were present in PUFA. Cooking had influence on lipid content and pressure cooking released greater amount of NL from marrow into the soup. Pressure cooking caused a decrease in saturated fatty acids. AS

Pork

1715

Long (VP) and Tarrant (PV). **The effect of pre-slaughter showering and post-slaughter rapid chilling on meat quality in intact pork sides.** *Meat Science* 27(3): 1990: 181-195

Products

Meat

1716

Riise (E) and Berg-Nielsen (K). **Improved extraction method for avoiding the interference of ascorbic acid in the spectrophotometric determination of nitrite in meat products.** *Analyst (London)* 115(9): 1990: 1265-1267

Salami

1717

Beilken (SL), Eadie (LM), Jones (PN) and Harris (PV). **Sensory and other methods for assessing salami quality.** *CSIRO Food Research Quarterly* 50(2): 1990: 54-66

Poultry

1718

Rosinski (MJ), Barmore (CR), Dick (RL) and Acton (JC). **Film-to-meat adhesion strength with a cook-in-the-film packaging system for a poultry meat product.** *Poultry Science* 69(2): 1990: 360-362

Chickens

1719

Dawson (PL), Sheldon (BW) and Ball (HR). **Effect of washing and adding spray-dried egg white to mechanically deboned chicken meat on the quality of cooked gels.** *Poultry Science* 69(2): 1990: 307-312

1720

Heath (JL), Owens (SL), Tesch (S) and Hannah (KW). **Effect of high-energy electron irradiation of chicken meat on thiobarbituric acid values, shear values, odour, and cooked yield.** *Poultry Science* 69(2): 1990: 313-319

1721

Lyon (BG) and Ang (CYW). **Effects of reheating method on off-flavour development in precooked, stored chicken patties.** *Poultry Science* 69(2): 1990: 320-328

1722

Shams El-Din (MHA) and Ibrahim (HM). **Cooking effects on fat and fatty acids composition of chicken muscles.** *Die Nahrung* 34(3): 1990: 207-212

The effects of boiling and roasting and cooking treatments on the lipid content of chicken breast and thigh muscles is studied. The changes in fat contents, acid value, peroxide and thiobarbituric acid values and fatty acid comp. are evaluated. BV

Broilers

1723

Lyon (BG) and Lyon (CE). **Texture profile of broiler *Pectoralis major* as influenced by post-mortem deboning time and heat method.** *Poultry Science* 69(2): 1990: 329-340

1724

Sams (AR), Janky (DM) and Woodward (SA). **Comparison of two shearing methods for objective tenderness evaluation and two sampling times for physical-characteristic analyses of early-harvested broiler breast meat.** *Poultry Science* 69(2): 1990: 348-353

Turkeys

1725

Salih (AM), Price (JF), Smith (DM) and Dawson (LE). **Lipid oxidation in turkey meat as influenced by salt, metal cations and antioxidants.** *Journal of Food Quality* 12(1): 1989: 71-83

1726

Allred (LC), Hendricks (DG), Mahoney (AW), Zhang (D) and Bell (DE). **Protein quality and iron bioavailability of mechanically and hand-deboned turkey meat fed to rats.** *Poultry Science* 69(2): 1990: 341-347

Poultry

Products

Eggs

1727

Raikhy (J) and Bawa (AS). **Citric acid pickling of chicken eggs.** *Poultry Guide* 28(6): 1991: 63-68, 73-74

The use of citric acid for pickling of chicken eggs has been evaluated. Eggs were kept for 48 h in refrigerator, hard-cooked in water for 15 min, cooled in running water for 2 min, peeled and pickled in 1, 3, 5 and 6% citric acid solutions and kept at ambient (20 - 25 C) and refrigeration (7 C) temp. till pH equilibrium was established. The pickling solutions as well as white and yolk were analysed for pH, protein and moisture. The pH of egg yolk and white gradually increased while the acidity of the pickling solution decreased during equilibration which took 8 - 10 days. The pH at equilibrium was almost the same for white, yolk and pickling solutions in different samples. Sensory evaluation indicated that 3% citric acid solution is favourable for chicken egg pickling. GS

1728

Burley (RW). **The hen's egg as a model for food technology.** *CSIRO Food Research Quarterly* 50(2): 1990: 42-47

The eggs as successful food package and informations useful for food technology in general are summerised in this article. Aspects covered are the eggs as antimicrobial package (the albumen gel, antiproteases and nutrient-binding proteins), the vitelline membrane, the yolk, the antioxidative mechanisms of the egg and the albumen. SRA

SEAFOODS

Oysters

1729

Indra Jasmine (G), Rajagopalsamy (CBT), Sugumar (G) and Jeyachandran (P). **Quality characteristic of freeze-dried edible oyster *Crassostrea madrasensis* (Preston).** *Journal of Food Science and Technology (India)* 27(6): 1990: 392-393

The flesh of edible oyster *Crassostrea madrasensis* (Prestron) was freeze-dried. The biochemical, microbiological and sensory evaluation of the fresh as well as the freeze-dried sample were determined.

There were no changes in the TMA, TVN, PV and FFA as a result of freeze-drying. The proximate comp. was not altered. AS

Shrimps

1730
Nerkar (DP) and Bandekar (JR). **Elimination of *Salmonella* frozen shrimp by γ-irradiation.** *Journal of Food Safety* 10(3): 1990: 175-180

When cells of shrimp were irradiated in frozen 0.1M phosphate buffer the D $_{10/}$ values of *Salmonella* sp. were between 0.225 to 0.250 kGy. The radiation resistance of these *Salmonella* sp. increased marginally when cells were irradiated in shrimp homogenate. A radiation dose of 4.0 kGy completely eliminated *Salmonella* from frozen prepackaged shrimp. KMA

Squids

1731
Falandysz (J). **Mercury content of squid *Loligo opalescens*.** *Food Chemistry* 38(3): 1990: 171-177

The mercury level has been determined in the edible and inedible tissues and in the whole raw and tinned squid. The method of measurement was cold-vapour AAS. The mercury levels were generally low, e.g. from 6.8 plus or minus 3.5 to 18 plus or minus 5 (3.0 to 28) μg kg $^{-1}$ wet-wt. for the edible and inedible parts of raw and tinned squid, and from 11 plus or minus 3 to 14 plus or minus 4 (6.3 to 23) for the whole squid. The level of mercury in tissues and carcasses examined was independent of the body wt. of squid (P>0.05). The results are compared with the levels found for different species of squid from various locations. AS

Fish

Catfish

1732
Smith (G), Hole (M) and Hanson (SW). **Assessment of lipid oxidation in Indonesian salted-dried marine catfish (*Arius thalassinus*).** *Journal of the Science of Food and Agriculture* 51(2): 1990: 193-205

Analysis of Indonesian salted-dried catfish (*Arius thalassinus* Ruppell) during processing and storage indicates that although peroxide, thiobarbituric acid and anisidine values give an indication of the onset of lipid oxidation, the values become negligible in the consumed products. Alternative methods have been developed and the significant, steady increases found in the levels of acetic acid soluble colour and fluorescence indicate that these parameters are realistic indicators of the tertiary products formed by interactions of carbonyl compounds with amino-type compounds. These increases are complemented by a fall in the level of free amino acids during storage of the product. A 30% loss of polyunsaturated fatty acids was found during salting, but no subsequent loss was found during drying and storage. AS

Hakes

1733
Lescano (G), Kairiyama (E), Narvaiz (P) and Kaupert (N). **Studies on quality of radurized (refrigerated) and non-radurized (frozen) hake (*Merluccius merluccius hubbsi*).** *Lebensmittel-Wissenschaft und - Technologie* 23(3): 1990: 317-321

Trout

1734
Montero (P) and Borderias (J). **Influence of age on muscle connective tissue in trout (*Salmo irideus*).** *Journal of the Science of Food and Agriculture* 51(2): 1990: 261-269

The physicochemical properties of the connective tissue in the muscle of trout (*Salmo irideus* Gibb) from 4 different age groups were studied. Solubility, thermal denaturation and the yields of the α, β and γ components were used as indices of collagen aggregation. Shear strength of connective tissue from different locations in trout fillets was also measured. Muscle connective tissue in the larger trout (1800 g) was more abundant and the collagen exhibited a lower level of crosslinking. However, shear strength values were significantly different only for the youngest specimens (200 g). Collagen crosslinking increased with size in the other three groups studied (200, 800 and 1200 g); the connective tissue from the 800-g and 1200-g specimens had similar shear strength values which were higher than those for the 200-g specimens. AS

Products

Fish

1735
Ganapati Hegde, Chandrasekhar (TC) and Dora (KC). **Quality of fish sausage incorporated with potato starch powder stored at refrigerated temperature (10 plus or minus 2 C).** *Indian Journal of Fisheries* 37(4): 1990: 327-333

Fish sausage was prepared from croaker (*Jhonius* sp.) meat by grinding and adding with different types of additives including potato starch powder at 7% level and packed in the Krehelon synthetic PVC casing. Sealed casings were cooked at 88 C for 69 min, cooled and stored at 10 plus or minus 2 C. The shelf-life of potato starch added samples (PSAS) were compared with the control (CL). Stored materials were analysed for about 4 1/2 wk for jelly strength, expressible water %, pH, volatile base nitrogen (VBN), trimethylamine-N, peroxide value, free fatty acid content, total plate count, and sensory quality. Results indicate that the CL and PSAS had a shelf-life of 33 and 30 days resp., in an acceptable condition. GS

1736

Dora (KC) and Hiremath (GG). **Surimi: A new scope for diversification of seafood exports.** *Seafood Export Journal* 23(3): 1991: 11-13

Surimi is mechanically deboned, washed and stabilised minced fish flesh, widely used as an intermediate product for fabricated foods including Kamaboko, fish sausage, imitation shrimp products, fish ball, fish burger, fish stick, fish cracker and similar products. Different types of fish caught in Indian seas especially the low-valued fish could be used for preparing surimi. Production process of frozen surimi, the new products that could be developed from surimi and its prospects in tropical developing countries are the aspects covered. KAR

1737

Morioka (K) and Shimizu (Y). **Texture and breaking property of kamaboko.** *Bulletin of the Japanese Society of Scientific Fisheries (Nihon Suisan Gakkai-shi)* 56(3): 1990: 531-536 (Ja)

To estabilish an objective measurement of textural quality of kamaboko, a fish jelly product in Japan, relations between mechanical parameters obtained by a puncture test and sensory scores for texture of different kinds of kamabokos were examined. "Toughness" score and "firmness" score of kamaboko were closely related to the product of breaking force (Fmax) and breaking dent (dmax) and to the ratio of Fmax to dmax, resp. No relationship was observed between "quality" score and those mechanical parameters, but the shape of force-dent curve was related to the quality score. Kamabokos whose force-dent curves were almost straight or slightly curved were mostly of good quality. On the other hand, kamabokos that showed concaved force-dent curves were of poor quality, except for those of Odawara type. The shape of the force-dent curve was affected by leaching and pre-incubation treatment before heating process, but was not much affected by the addition of water or starch. AS

1738

Makinodan (Y) and Hujita (M). **Effect of the addition of silvers of ginger on the gel strength of *Kamaboko*.** *Bulletin of the Japanese Society of Scientific Fisheries (Nihon Suisan Gakkai-shi)* 56(3): 1990: 537-542 (Ja)

Additives such as mushroom and ginger are often mixed with fish meat paste to lend var. to *Kamaboko*. In this case, it has been inferred that a proteinase existing in additives affects the texture of *kamaboko*. Therefore, it was ascertained whether the addition of ginger or pickled ginger (*beni shouga*) to fish meat paste exerts an influence on the texture of the product by the action of the proteinase, by using electrophoresis and the measurement of gel strength. The addition of silvers of ginger to fish meat paste caused the degradation of myofibrillar proteins such as myosin heavy chain, actin, tropomysin and troponin-T and the decrease of the gel strength of *Kamaboko*. Such effects were not observed by the use of heated ginger. Similar tendencies were also obtained when the enzyme solution from ginger was mixed with the fish paste. These results show that fish meat (paste) proteins were hydrolyzed by the proteinase exuded from silvers of ginger to cause the textural degradation of *Kamaboko*. On the other hand, the addition of pickled ginger had no effect on the protein hydrolysis, nor on the decrease of the gel strength of *Kamaboko*. AS

Oils

1739

de Koning (AJ), Theodora Mol, Przybylak (PF) and Thornton (SJ). **The free fatty acid content of fish oil. Part II. The effect of anchovy quality on the free fatty acid content of the resulting anchovy oil and meal.** *FAT Science Technology* 92(5): 1990: 193-197

Products

Surimi

1740

Hsu (SY). **The effect of selected processing variables on the quality of raw surimi.** *Journal of Food Engineering* 11(3): 1990: 241-250

A four-factor, three-level factorial design method was adopted for studying the effects of the four major unit operations involved in raw surimi processing systems. Each unit operation was represented by

one major processing feature. The gel strength of the surimi products was shown to be significantly affected by leaching, grinding, setting and heating and their two-way interactions. The whiteness of the fish sausage was primarily affected by leaching and the interaction of leaching and grinding. Significant correlations were obtained between instrumental and sensory quality attributes. The significant effect of interaction terms implies that the conventional 'one variable at a time' strategy is inadequate to optimize surimi processing systems. AS

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Non-alcoholic beverages

1741

Fung (Y-S) and Luk (S-F). **Polarographic determination of sorbic acid in fruit juices and soft drinks.** *Analyst (London)* 115(9): 1990: 1219-1221

A simple differential-pulse polarographic method using a lab.-built hanging mercury drop electrode as the working electrode was developed for the detn. of sorbic acid in fruit juices and soft drinks. Sorbic acid was extracted from the samples with diethyl ether. After reduction of the ethereal solution to a small volume by direct evaporation, the residual ether was dissolved in the supporting electrolyte (25 ml of acetonitrile + 1 ml of 0.06 M acetic acid + 0.8 g of tetraethylammonium bromide). Peak current was measured at -1.7 V. The working range of the method, without dilution or pre-concn. of the samples, was from 4 to 229 p.p.m. for the original juice and drink samples. The validity of the method was confirmed by parallel detn. using the method of the Association of Official Analytical Chemists and by recovery tests on a large var. of juice samples. Satisfactory recoveries and agreement in results from the two methods were obtained. The recovery and precision (relative standard deviation) of the method were 97 plus or minus 4 and 100 plus or minus 3%, resp., for blackcurrant juice for five detn. AS

Coffee

1742

Stalder (R), Bexter (A), Wurzner (HP) and Luginbuhl (H). **A carcinogenicity study of instant coffee in Swiss mice.** *Food and Chemical Toxicology* 28(12): 1990: 829-837

Fruit juices

1743

Khurdiya (DS). **Orange concentrate based carbonated beverage.** *Journal of Food Science and Technology (India)* 27(6): 1990: 394-396

A formulation for orange conc. based carbonated beverage has been standardized. The carbonated beverage made from syrup base containing 7.5% orange conc. was equivalent to about 10% of single strength orange juice which was considered optimum. The carbonated beverage was made by post mix method and a beverage with a Brix to acid ratio of 45 and carbonated at 80 psi gas pressure was found to be the best. AS

1744

Fisher (DP). **Aseptic packaging of juice and juice drinks.** *Food Trade Review* 60(8): 1990: 436-437, 440

1745

Velez (C), Izquierdo (L) and Costell (E). **Sensory analysis of fruit juice aroma.** *Revista de Agroquimica Y Technologia de Alimentos* 30(1): 1990: 23-40 (Es)

The suitability of the different types of sensory tests for the sensorial analysis of the aroma of fruit juices is reviewed. Preference-acceptance, discriminatory and descriptive tests as well as direct evaluation of similarity-dissimilarity are considered and their advantages and disadvantages are discussed. AS

1746

Chandler (BV). **Fruit juice review - 4.** *Food Australia* 42(7): 1990: 343-345

This review covers the raw materials, juice processing (general), citrus juice processing and juice processing of other fruits, packaging and storage, chem. analysis and comp., adulteration control and industrial aspects. SRA

Grape juices

1747

Yokotsuka (K). **Effect of press design and pressing pressures on grape juice components.** *Journal of Fermentation Technology (Hakko Kogaku Zasshi)* 70(1): 1990: 15-21

Commercial-sized presses were used to destemmed and crushed Koshu grapes with stems at different pressures. It was found that the comp. of the juices was significantly affected by the type of press, pressing pressure, and presence or absence of stems. The free-run had the highest concn. of glutathione while pressing at moderate pressures yielded juice with very high concn. of proteins and polyphenoloxidase (PPO). On the other hand, max. concn. of phenols including caffeoyl tartrate (caftaric acid), 2-S-glutathionyl caftaric acid (GRP), catechin and epicatechin were found in juices from high pressure pressing. The low concn. of glutathione, when compared to the amounts of caftaric acid and PPO, is one of the major reasons why Koshu juice is very susceptible to browning. AS

Mandarin juices

1748

Ramteke (RS) and Eipeson (WE). **Storage studies on Coorg mandarin juice concentrates packed in various containers.** *Journal of Food Science and Technology (India)* 27(6): 1990: 368-371

Coorg mandarin juice conc. (68 Brix) was prepared using forced circulation evaporator. One batch of conc. was prepared after aroma recovery. The fresh juice conc., aroma stripped juice conc. and stripped juice conc. to which recovered aroma was added were packed in plain OTS cans (A two and a half), HDPE bottles (1 kg) and paper/Al foil laminate pouches (750 g). They were stored at 25-28 C (RT), 0, -8 and -18 C and analysed for various quality parameters like browning index, carotenoids, ascorbic acid, cloud and sensory quality. It was found that conc. could be stored without appreciable changes for 6 months at 0 C. For longer storage, temp. below 0 C are preferable. Orange juice conc. with and without aroma addition did not show any difference. AS

Tea

1749

Sarkar (PK) and Chakraborty (R). **Enrichment and isolation of caffeine degrading bacteria (*Pseudomonas* spp.) from brewed tea waste dumping ground.** *Indian Journal of Experimental Biology* 29(7): 1991: 679-680.

Two caffeine degrading bacteria were isolated from brewed tea waste dumping ground following enrichment in media containing caffeine as the only N source. After 24 h incubation both the isolates degraded 50% of the caffeine in the medium. *Pseudomonas putida* isolate R x P $_1$, could not degrade the residual caffeine beyond 24 h (max. degradation 50.3%) while *P. cichorii* isolate R x P $_2$ degraded 96% of the caffeine in 72 h. SRA

1750

Nagabhushan (M), Sarode (AV), Nair (J), Amonkar (AJ), D'Souza (AV), Bhide (SV). **Mutagenicity and carcinogenicity of tea, *Camellia sinensis*.** *Indian Journal of Experimental Biology* 29(5): 1991: 401-406

Aqueous, caffeine free and tannin fractions of tea as well as tannic acid were tested at different concn. on *Salmonella typhimurium* strains TA 100, TA 1535, TA 98 and TA 1538 with or without metabolic activation (rat - S9 mix). Tea aqueous extract and tannic acid were non-mutagenic, with or without S9 mix; caffeine free fraction and tannin fraction were also non-mutagenic. Tobacco extract at 100 MUg/plate induced 266 plus or minus 21 His $^+$ revertants in strain TA 98 with S9 mix. Tannin fractions and tannic acid inhibited the mutagenicity of tobacco extract in a dose dependent manner. Injection of all the three extracts failed to produce tumors, during their entire lifetime of rats. Oral administration of total aqueous extract and total caffeine free fraction (TCFF) and tannin fraction did not increase tumor incidence compared to control. No histopathological changes were seen in animals fed with tea fraction for long duration. Subcutaneous administration of tea fractions also did not induce tumors. Caffeine free fraction of tea decreased liver tumor incidence in hexachlorocyclohexane (HCH) treated mice. Though the decrease in HCH treated group was marginal, in tobacco extract (TE) treated group liver tumor incidence came down from 4 to 1 causing 50% reduction in tumor incidence as compared to tobacco extract treated groups. TCFF however had no effect on lung tumor incidence in TE treated mice. SRA

FATS AND OILS

1751

Arens (M), Fiebig (H-J) and Homberg (E). **Determination of the total sterol content (digitonid precipitation) - Survey by a working party of the DGF, 115th report: German standards methods for investigation of fats, fatty products, tensides and related materials, 87th report: Analysis of minor components of lipids. VIII.** *FAT Science Technology* 92(6): 1990: 227-228 (De)

1752

Arens (M), Fiebig (H-J) and Homberg (E). **Sterols (isolation and GC-determination) - Survey by a working party of the DGF, 114th report: German standard methods for investigation of fats, fatty products, tensides and related materials, 86th .Report: Analysis of minor components of lipids. VII.** *FAT Science Technology* 92(5); 1990; 189-192 (De)

1753

Sulthana (SN) and Sen (DP). **Quality of lipids of Indian deep fat fried food products.** *FAT Science Technology* 92(5); 1990; 206-212

Deep fat fried products were prepared using fresh and heat abused (heated) groundnut oil, procured from market as well as prepared in lab. Quality of lipid extracted from these products and that of frying oils were determined. It has been found that when the moisture content of a product is high (45% or more), the quality of its lipid is inferior to that of its frying oil and when the moisture content is low (10% or less), the quality of its lipid is superior to that of its frying oil. N

Oils

1754

Sharma (GK), Madhura (CV) and Arya (SS). **Interaction of plastic films with foods. II. Effect of polyethylene and polypropylene films on the stability of vegetable oils.** *Journal of Food Science and Technology (India)* 27(6); 1990; 328-331

Effect of plastic films contact (polyethylene, polypropylene and butylated hydroxy anisole (BHA) and butylated hydroxy toluene (BHT) incorporated polyethylene) on the storage stability of refined sunflower oil and groundnut oil was studied at 37 C. The changes in peroxide value (PV), thiobarbituric acid (TBA) and total carbonyls (Tc) were significantly lesser in the presence of plastic films than in control samples. Relatively, reduction in the rate of autoxidation was more pronounced in the presence of antioxidant incorporated film. Both butylated hydroxy toluene were found to leach out in vegetable oils during storage. AS

1755

Di Muccio (A), Ausili (A), Vergori (L), Camoni (I), Dommarco (R), Gambetti (L), Santilio (A), Vergori (F). **Single-step multi-cartridge clean-up for organophosphate pesticide residue determination in vegetable oil extracts by gas chromatography.** *Analyst (London)* 115(9); 1990; 1167-1169

A multi-cartridge system has been developed which, in a single step, performs the extraction and clean-up of organophosphate (OP) pesticide residues from oils and fatty extracts. A solution in hexane containing up to 1.8 g of lipidic material is loaded on to an Extrefut-3 column to which a silica-gel cartridge and a C_{18} silica cartridge have been connected in series. The OP pesticide residues are eluted with 15 ml of acetonitrile. Carry-over of fatty material is in the range 2-5 mg per 1.8 g of different oils, which makes the final solution amenable to capillary gas chromatography. Recoveries of 23 OP pesticides were in the range 82-111%. The whole procedure takes ca. 20 min and compares favourably with current procedures. AS

Rapeseed oils

1756

Cossement (M), Michaux (M), Lognay (G), Gibon (V) and Deroanne (C). **Effect of erucic acid on the polymorphism of hydrogenated rapeseed oil.** *FAT Science Technology* 92(6); 1990; 229-232

The polymorphism of rapeseed oils with high and low erucic content was investigated using differential scanning calorimetry and X-ray diffraction. Both oils were hydrogenated to various iodine values. The fatty acid pattern showed that erucic acid is slowly saturated. The melting curves were followed by DSC and pulsed NMR. For low iodine value the low erucic acid rapeseed oil exhibits a second melting peak owing to the appearance of new triglycerides with different properties. Samples of hydrogenated rapeseed oils were aged at 20 and 29 C. The short spacings determinations indicate that the β'-β transition is faster for the low erucic acid rapeseed oil (LEAR) than for the high erucic acid rapeseed oil (HEAR). AS

Rice bran oils

1757

Munshi (SK), Kakar (A) and Sukhija (PS). **Effect of different degumming agents on the physico-chemical characteristics of rice bran oil.** *Journal of Food Science and Technology (India)* 27(5); 1990; 280-283

Laboratory refined rice bran oil showed lower hydroxyl, acetyl and peroxide values and higher saponification and iodine values than industrial refined and unrefined oils. Citric acid was most effective in facilitating degumming and dewaxing. Decreases in hydroxyl and acetyl values were

significant ($P < 0.05$) with phosphoric, citric and oxalic acids by wet de-gumming in comparison to phosphoric acid by dry de-gumming. The peroxide value was also decreased with citric acid and phosphoric acid as degumming agents. Free fatty acid contents decreased significantly during neutralization and most of the phospholipids were removed at the stage of degumming. Refined oil contained lower amounts of phosphatidyl ethanolamine and phosphatidic acid. AS

1758

Kader (EA). **Problems and prospects of rice bran oil.** *Chemical Age of India* 40(12): 1989: 579-580

1759

Subrahmanyan (G). **Low-FFA rice bran oil. Production problems and prospects.** *Chemical Age of India* 40(12): 1989: 581-582

Shea nut oils

1760

Turpin (PE), Coxon (DT) and Padley (FB). **The fractionation of shea nut oil using supercritical carbon dioxide. A feasibility study for the extraction of oil from gum.** *FAT Science Technology* 92(5): 1990: 179-184

Supercritical carbon dioxide (SC-CO_2) successfully extracted triglycerides from crude Shea nut oil (*Butyrospermum parkii*) at temp. of 40-80 C and pressures of 100-400 bar. Selective removal of free fatty acid, mono- and di-glycerides, iron, triterpene acetates, triterpene cinnamates and polyisoprenoid gum from triglyceride was achieved by varying the solvent power of the SC-CO_2. Triglyceride so produced had a higher stability to oxidation than the crude oil. Polyisoprenoid gum was essentially insoluble in SC-CO_2. The extraction partially fractionated the triglycerides according to their carbon numbers. AS

SPICES AND CONDIMENTS

Spices

1761

Box (H). **Developments in the spices trade. A review.** *British Food Journal* 91(6): 1989: 15-18

The past, present and future of world spices production are described. Covers spice exporting countries, importing countries, end users and oils and oleoresins. BV

Chillies

1762

Tewari (VP). **Development of high capsaicin chillies (*Capsicum annuum* L.) and their implications for the manufacture of export products.** *Journal of Plantation Crops* 18(1): 1990: 1-13

The chilli var. 'Pusa Jwala' with high capsaicin (0.6 -0.7%) is comparable with high pungency chillies of the world market. The development of the chilli var. 'Pusa Jwala' has opened up a new era in the export of chilli products. A superior quality chilli'Pusa Sadabahar' has recently been developed with 12% capsaicin in oleoresin, 50% more than 'Pusa Jwala'. BV

1763

Rajagopal. **Marketing of chillies in Tamil Nadu - a case study.** *Indian Cocoa, Arecanut & Spices Journal* 14(1): 1990: 25-27

Marketing of chillies in a regulated market and through private trade channels in open market in Tamil Nadu State (India) has been studied with respect to (i) market arrivals (ii) trade practices (iii) price structure and (iv) response of buyers and sellers on general social and economic issues. The survey indicates that more chillies are arriving to open market than to regulated market. The transaction of chillies in the regulated market is through the secret tender system and in the open market is of speculative nature. The difficulties experienced by farmers in selling their product in open market, facilities available in regulated market have been indicated. Delay in disposal of the product is the main disadvantage with the regulated market. GS

Cumin

1764

Badr (FH) and Georgiev (EV). **Amino acid composition of cumin seed (*Cuminum cyminum* L.).** *Food Chemistry* 38(4): 1990: 273-278

Pepper

1765

Variyar (PS) and Bandyopadhayay (C). **On the carotenoids of ripened pepper berries (*Piper nigrum* L.).** *Journal of Food Science and Technology (India)* 27(5): 1990: 294-295

Three carotenoid pigments namely $beta$-carotene, lycopene and leutin were tentatively identified in the

pericarp of ripened berries of pepper (*Piper nigrum* L.) for the first time using TLC and spectrophotometric methods. AS

1766

Geetha (CK) and Sivaraman Nair (PC). **Effect of plant growth regulators and zinc on spike shedding and quality of pepper.** *Indian Cocoa, Arecanut & Spices Journal* 14(1); 1990; 10-12

Pepper plants were sprayed twice with the growth regulator and Zn in the fruiting season, first immediately after the formation of spikes and the 2nd, one and half months later. The growth regulators applied were indole acetic acid (IAA), naphthalene acetic acid (NAA), planofix and vardhak each at 50, 100 and 150 p.p.m. separately, 2,4-D at 5, 10 and 15 p.p.m. and Zn at 0.5% (as zinc sulphate). Results indicated that though the effect of various chemicals was found to be non-significant in controlling spike shedding, there was significant increase in the vol. and wt. of berries. No significant difference was observed due to the different treatments either in recovery % of dry pepper from green pepper, or the oleoresin content of pepper. None of the chemicals was found to be superior in effect. However, IAA at 50 p.p.m., planofix at 50 p.p.m., Zn at 0.5% and 2,4-D at 5 p.p.m. reduced spike shedding by 63.63, 52.20, 48.40 and 35.34% resp. compared to control. GS

1767

Sumathy Kutty (MA), Madusudana Rao (J), Narayanan (CS) and Velappan (E). **Chemical analysis of some new varieties of pepper from Andhra Pradesh and Assam.** *Indian Cocoa, Arecanut & Spices Journal* 14(2); 1990; 58-60

The chem. comp. of two pepper var. (*Chappagedda* and *Maredumalli*) from Andhra Pradesh and one var. from Assam was compared with a commercial var. Volatile oil content is high (3.69%) in *Chappagedda* var.; oleoresin is high in Assam var. (10.11%); *Maredumalli* var. has low value for volatile oil (2.63%); piperine (4.64%) and oleoresin (8.18%) content. Gas chromatographic analysis of the volatile oil showed that β-pinene content is high in *Chappagedda* var. (39.64%), *Maredumalli* (38.5%) and Assam (34.5%) samples, whereas in commercial black pepper sample it is only 23%. α-pinene content is more or less same in *Chappagedda* and commercial samples. δ^{3}-carene is more in commercial sample (12.4%); β-caryophyllene content is very high in commercial sample (16.18%) as compared to 5.5% in the other three samples. Camphene and α-terpienol is almost same in all the var.; d-limonene is high in Andhre and Assam samples. 'GS

Turmeric

1768

Pathania (NK), Mohan Singh and Prem Singh Arya. **Variation for volatile oil content in turmeric cultivars.** *Indian Cocoa, Arecanut & Spices Journal* 14(1); 1990; 23-24

Volatile oil content of 23 turmeric var. were determined. Oil content was min. (2.07%) in Madhopur, Coorg and max. in IC 29909 (11.18%). Av. oil content was found in Lana Selection (6.47%) and IC 26804 (5.57%). GS

SENSORY EVALUATION

1769

Szczesniak (AS). **Texture: is it still an overlooked food attribute?.** *Food Technology* 44(9); 1990; 86-95

1770

Hirsch (AR). **Smell and taste: How the culinary experts compare to the rest of us.** *Food Technology* 44(9); 1990; 96, 98, 100, 102

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Nil

BIOCHEMISTRY AND NUTRITION

1771

Tandon (S), Prabhakar (AR) and Udupa (S). **Effect of diet on caries-inducing *Streptococcus mutans* growth.** *Food Chemistry* 38(4); 1990; 289-296

Different food preparations have been tested for support of growth of the bacteria *Str. mutans in vitro* both before and after chewing. Fish fry and the sweet dishes- *kesari baath* and *kadla payiasa*-supported the growth of *Str. mutans* maximally, whereas bananas and potato chips did not support growth at all. All other foodstuffs supported from mild (*dosa, upma*) to moderate (rice preparations, yoghurt) degrees. *Dosa* and *upma* supported growth of *Str. mutans* to a greater extent after chewing, whereas in

all other cases, chewing did not further enhance the growth. AS

1772

Belitz (H-D) and Weder (JKP). **Protein inhibitors of hydrolases in plant foodstuffs.** *Food Reviews International* 6(2): 1990; 151-211

In this review the topics covered are protein inhibitors of hydrolases occurring in plant tissues used as foods, their chemistry including isolation, structure and properties; physiological function, inactivation during processing, toxicology and the uptake by human beings. The analytical aspects are also discussed along with procedures for inhibitor activity detn. 419 references. SRA

1773

Venkateswara Rao (K) and Mahajan (CL). **Fluoride content of some common South Indian foods and their contribution to fluorosis.** *Journal of the Science of Food and Agriculture* 51(2); 1990; 275-279

Fluoride contents of 98 food items used in South India were determined with special reference to the feeding habits of remote rural populations in 41 villages of Anantapur District, Andhra Pradesh, India, where dental and skeletal fluorosis is endemic. Fluoride up to 4.5 mg kg^{-1} was found in irrigation and drinking water supplies. Thirty-two locally grown food items had generally higher fluoride contents (ranging from 0.2 - 11.0 mg kg^{-1}) with the notable exception of coconut water where even traces of fluoride could not be detected. The combined daily intake of fluoride from food and drinking water in the local population was found to range from 2.2 mg to 7.3 mg (0.05 - 0.32 mg kg^{-1} BW). The role played by food comp., cooking habits of the local population, general poverty and illiteracy in contributing to the prevalence of fluorosis in school children in the age group 6-18 yrs (even in areas with drinking water supplies within the permissible levels as per WHO standards) is discussed. AS

1774

Molly Thomas, Leelamma (S) and Kurup (PA). **Neutral detergent fibre from various foods and its hypocholesterolemic action in rats.** *Journal of Food Science and Technology (India)* 27(5); 1990; 290-293

Dietary fibre from blackgram, barley, ragi and rice bran was isolated as neutral detergent fibre (NDF) and their effect on cholesterol metabolism studied in rats fed high fat-cholesterol diet. The chem. comp. of each fibre was also determined and the cholesterol lowering action correlated with the chem. comp. It was seen that the hemicellulose content of the different fibre correlated with the effect on cholesterol metabolism. Barley NDF with its max. hemicellulose content produced lowest concn. of serum and tissue cholesterol, highest concn. of hepatic and fecal bile acids and fecal sterols. *In vitro* binding studies also showed that barley NDF bound max. amount of bile acids. AS

1775

Harikumaran Thampi (BS), Manoj (S), Leelamma (S) and Menon (VP). **Dietary fiber and lipid peroxidation: Effect of dietary fiber on levels of lipids and lipid peroxides in high fat diet.** *Indian Journal of Experimental Biology* 29(6); 1991; 563-567

Male albino rats were given isocaloric fiber free diet (G1), blackgram neutral detergent fiber (NDF) diet (G2), and coconut NDF diet (G3). Concn. of cholesterol and phospholipids showed significant decrease in the serum, liver, aorta and intestine of coconut NDF and blackgram NDF groups compared to control; free fatty acids (FFA) showed a decrease in both the fiber groups in liver, intestine and heart. Serum and proximal colon showed decrease in FFA concn. only in coconut NDF groups. In both the fiber groups malondialdehyde (MDA) concn. decreased in liver, intestine and distal colon whereas the concn. of hydroperoxides increased in liver and heart. Significant decrease in the concn. of coagulated dienes was observed in liver, intestine and proximal colon of the experimental groups. Superoxide dismutase (SOD) and catalase activity was found to increase in liver, intestine, heart, distal colon and proximal colon in both the fiber group. Serum ceruloplasmin levels showed a slight increase in animals fed coconut and blackgram NDF. The animals of different NDF groups showed significant decrease in glutathione levels in liver, intestine, proximal colon, distal colon and heart. SRA

1776

El-Khoury (AE). **Recent developments in the search for methods of assessing zinc status.** *Trends in Food Science and Technology* 2(1); 1991; 10-12

This review examines potential new biochemical indicators of Zn status. Aspects covered include Zn metabolism, shortcomings of using Zn concn. of body fluids and tissue to assess Zn status, potential indicators of Zn status (thymulin and metallothionein), and possible future approaches to the assessment of Zn status. 22 references. BV

1777

Timmermann (VF). **Tocopherols - antioxidative effect on oils and fats.** *FAT Science Technology* 92(5); 1990; 201-206 (De)

The main reason for the deterioration of fats and oils is a chem. reaction between the oxygen and the double bonds which are contained in the unsaturated fatty acids. In the course of the autoxidation intermediate peroxides affect the vitamins sensitive to oxidation. They lower the content of physiologically valuable essential fatty acids. The oxidation stability of oils and fats depends on the natural content of tocopherols as well as on the comp. of the fatty acid. The effect of the added tocopherols depends on the natural content of tocopherols. Lipids with lower contents can be stabilized very well with antioxidants consisting of tocopherols. Here animal fats as well as synthetical lipids are considered which in particular are used in cosmetic industry and in the field of pharmacy but also in food industry. Vegetable oils contain, due to their nature, high contents of tocopherols which are partly removed or oxidised during raffination and storage. Therefore adding antioxidants containing tocopherols is advisable. Also an addition of reducing substances as for instance ascorbylpalmitate is recommended. Moreover antioxidant systems should consist of heavy metal chelating substances. AS

TOXICOLOGY

1778

Goto (T). **Mycotoxins: Current situation.** *Food Reviews International* 6(2): 1990: 265-290

Aspects covered in this review include: toxigenic fungi and their toxic effects, analysis of mycotoxins (aflatoxins, trichothecene, some other mycotoxins of interest), and regulatory actions. 142 references. SRA

1779

Balachandran (B), Sivaswamy (SN) and Sivaramakrishnan (VM). **Mutagenicity of nitrosated food items.** *Indian Journal of Experimental Biology* 29(7): 1991: 676-678

Salted and sun-dried ribbon fish (*Scomberomorus commerssonnii*), whitebait fish (*Stolephorus bataviensis*), seer fish (*Trichiurus lepturus*), cluster beans (*Cyamopsis tetragonaloba*), chillies (*Capsicum annum*) and *Solanum torvum* were collected from local market and fried in palm oil to improve the palatability. Cumin seeds, pepper, aniseeds, ginger, cardamom, mint leaves (all pyrolysed) decoctions were tried for nitrosation. *Cissus quadrangularis* in indigenous medicinal plant was also used. These foods after nitrite treatment under simulated gastric conditions, were found to be mutagenic in *Salmonella typhimurium* tester strain TA 100. Dichloromethane extracts of ribbon fish, seer fish, whitebait, salted and sun-dried vegetables, cinnamon and fried mustard were mutagenic but dichloromethane extracts of *Solanum torvum*, cumin seed, ginger, aniseed and Cissus were not mutagenic. The ethylacetate extract of ribbon fish and whitebait fish were mutagenic but not of seer fish, cluster beans and chillies. SRA

FOOD LAWS AND REGULATIONS

1780

Lina (BAR), Meulen (HCD) and Leegwater (DC). **Subchronic (13-week) oral toxicity of neohesperidin dihydrochalcone in rats.** *Food and Chemical Toxicology* 28(7): 1990: 507-513

1781

Morgan (DL), Bucher (JR), Elwell (MR), Lilja (HS) and Krishna Murthy (AS). **Comparative toxicity of ethylene dichloride in F344/N, Sprague-Dawley and Osborne-Mendel rats.** *Food and Chemical Toxicology* 28(12): 1990: 839-845

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